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DISEASES CAUSED BY BACTERIA AND FUNGI.

—. (1935). **Classification of Hemolytic Streptococci in Relation to the Diagnosis, Prevention and Treatment of Streptococcus Infection.**—*Amer. publ. Hlth Ass. Yearb. 1934-1935.* pp. 140-142. [20 refs.] Suppl. to *Amer. J. publ. Hlth.* **25.** No. 2.

A brief summary of the various methods which have been proposed for classifying streptococci, accompanied by references to the original papers and with regard particularly to their value for distinguishing pathogenic from non-pathogenic strains. Antigenic methods are favoured, but it is surprising that no mention is made of the group precipitin test described by LANCEFIELD [this *Bull.* **4.** 199].

—A. W. STABLEFORTH.

ALVAREZ, R. G. (1935). Algunas observaciones en torno á las lesiones histologicas de la mastitis estreptocócica de la vaca. [**Observations on the Histology of Bovine Streptococcal Mastitis**].—*An. Esc. sup. Vet. Madrid. 1935.* pp. 49-53. 9 figs. on 5 plates. [1 ref.] [Also published in *Rev. Hig. Sanid. pecuar.* **25.** 649-657].

The author gives a detailed description of the histology and cytology in a case of chronic streptococcal mastitis. Catarrhal changes were not prominent. The galactiferous tubules and alveoli were dilated and the membrane was covered with papilli. The inflammatory exudate seen in some alveoli consisted chiefly of lymphocytes and desquamated epithelial cells. The abundance of plasma cells and phagocytes is of assistance in diagnosis.—R. S. ROBERTS.

RABAGLIETTI, D. (1934). Su alcuni focolai di mastite gangrenosa dei caprini in Valle Anzasca. [**Gangrenous Mastitis in Goats in the Anzasca Valley (Italy)**].—*Boll. Ist. Zooprofil. Sper., Turin.* March. pp. 47-52.

Gangrenous mastitis in goats is an acute sporadic disease which causes heavy losses not only from the death of affected animals, but also from the fact that those animals which recover are no longer suitable for breeding purposes. The first symptoms are dullness, anorexia and cessation of rumination. Later, one or more quarters of the mammary gland become painful, swollen and dark red in colour. After 24 to 48 hours, gangrene develops and the animals die in four to five days. Pure cultures of a Gram-positive micrococcus have been isolated from the lesions.

The organism grows readily on most culture media, does not produce indol and ferments glucose, lactose, saccharose, maltose, mannite and galactose. Treatment is most unsatisfactory although the use of an autogenous vaccine has given encouraging results.—J. A. NICHOLSON.

GARCIA, I. (1934). Algunos cambios morfologicos del B. anthracis. [**Some Morphological Changes in** *Bacillus anthracis*].—*Trab. Inst. Biol. anim. Madr.* **2.** 60-87. 22 figs., 1 table. [Also published in *Rev. Hig. Sanid. pecuar.* **25.** 28-49].

The author has studied the morphology of *B. anthracis* under varying conditions in the body and when grown on special media. He finds that a wide range of pleomorphism may be produced, including Gram-positive granules, streptococcal forms and Gram-negative rods. He suggests that this may explain the so-called variants of *B. anthracis* which have been described from time to time.—R. S. R.

PINTO, C. (1935). Carbunculo hematico. [**Anthrax**]. pp. 32. 16 figs. Rio de Janeiro : Biblioteca Agricola do " O Campo ". [8vo].

The author makes no claim to originality but merely gives a very full and well-illustrated description of all aspects of the disease, with analyses of its incidence in countries for which statistics are available. Only one paragraph is devoted to anthrax in Brazil.—R. S. ROBERTS.

ZUVERKALOW, D. A., & KRASOW, W. M. (1935). Proteolytische Fähigkeiten des B. anthracis. I. Mitteilung. II. Mitteilung : Zusammenhang der Proteolyse mit der Virulenz der Mikroben. III. Mitteilung : Die Abhängigkeit der Proteolyse von verschiedenen Faktoren. [**Proteolytic Power of** *Bacillus anthracis*. **I. II : Relation between Proteolytic Power and Virulence. III : The Dependence of Proteolysis on Various Factors**].—*Arch. wiss. prakt. Tierheilk.* **69.** 363-369, 370-374 and 375-379. 16 figs., 1 table. [19 refs.]

The ability of *B. anthracis* to break down protein appeared to be correlated with the virulence of the strain under test, virulent strains being the more proteolytic. Proteolysis proceeded more rapidly at a pH of 7·1 than at pH 6·7. Also, the proteolytic power of an individual strain could be enhanced by animal passage. Conversely, by growing a strain of high virulence and proteolytic power for long periods without sub-culture, the speed of proteolysis as well as the degree of virulence became reduced. Rate of proteolysis was also found to be dependent upon the type of protein used for the test. Thus there was but little difference in the rate of breakdown of gliadin (a vegetable protein) by virulent and avirulent strains. Similarly, casein is rapidly destroyed, gliadin more slowly and albumin and globulin more slowly still by the enzymes of the anthrax bacillus. Filtration of culture through filters which held back the bacilli lowered the proteolytic enzyme content only slightly. Increased phosphate content of the medium increased the proteolytic power of culture but not of filtrate. Increased sodium chloride content gave similar results.—E. J. PULLINGER.

I. RAMON, G., & STAUB, A. (1935). Essais sur la vaccination charbonneuse. [**Anti-Anthrax Vaccination Experiments**].—*C. R. Soc. Biol. Paris.* **119.** 1073-1076. [9 refs.]

II. RAMON, G., & STAUB, A. (1935). Sur la vaccination charbonneuse. [**Anti-Anthrax Vaccination**].—*C. R. Acad. Sci., Paris.* **201.** 241-243. [8 refs.]

I. Following successful experiments with rabbits when using Pasteur's first vaccine in lanolin, the authors then experimented on vaccination for a year on sheep.

In one experiment five lots of three sheep each were taken. Four of the lots were injected in accordance with the following known methods :– (1) Pasteur double method ; (2) Besredka's method ; (3) carbozoo, and (4) first Pasteur vaccine with alum. A fifth lot received one injection of 1 c.c. of Pasteur's first vaccine in lanolin (suspension of spores 0·3, lanolin 5, oil 15).

After five or six weeks, all the vaccinated animals were tested by means of a virulent culture. Those vaccinated in accordance with the classical Pasteur method resisted ; those vaccinated intradermally (Besredka's method) survived after a relatively severe general reaction. Of three sheep which received the saponin vaccine (carbozoo), one died and two survived after a high temperature reaction. The sheep vaccinated with the first Pasteur vaccine, to which alum was added, and also those inoculated with the same vaccine mixed with lanolin, showed merely a slight passing temperature. Other experiments by the authors convinced them of the possibility of conferring a solid and lasting immunity on sheep by means of one dose of Pasteur's first vaccine in lanolin.

II. Substantially the same as I.—M. Burke.

Hupbauer, A., & Gojkovic, D. (1935). Prilog k imuniziranju protiv bedrenice glukozidskom vakcinom. [**Immunization against Anthrax by Means of Glucoside Vaccine**].—*Jugoslov. vet. Glasn.* **15.** 113-124. 13 tables. [20 refs.]

After careful observation the authors came to the conclusion that the Pasteur anthrax vaccine was too virulent. They therefore prepared a glucoside vaccine by a method similar to that of Mazzuchi. A series of preliminary experiments on the dose and concentration of the vaccine was carried out both on cattle and sheep. Eventually the dose and concentration were fixed as 0·5 c.c. of a suspension containing 700 million bacilli per c.c. for cattle and 0·2 to 0·3 c.c. of this suspension for sheep.

The vaccine prepared in this manner at the State Bacteriological and Serological Institute at Krisevci was found to be safe : the immunity acquired developed in six days and was found to last for eight to nine months. A local reaction developed at the site of injection and lasted for eight to nine days : there was no general reaction. A detailed report of the experiments is given.

Smirnoff, G. E. (1934). **Complications in Anti-Anthrax Vaccination of Horses.** —*Sovyet. Vet.* No. 11. pp. 12-16. 1 table. [Abst. from French summary.]

The Commission of Biological Standards (" Commission des Matrices ") found great variation in the potency of the first and second vaccines of Tzenkovsky. Of those examined, No. 20 sample of first vaccine was considered the most satisfactory (by white mice titration) and No. 65 sample of second vaccine the weakest, though not devoid of necessary immuno-biological properties (by guinea pig titration). Trials of various combinations of the different samples of these vaccines given intradermally to horses gave varying results. The most violent reaction was after the combination of the two above-named samples. The author concludes that laboratory animal titration is not sufficient for horses. In double vaccination the strength of the second vaccine should not be considered as the principal cause of vaccinal complications in the horse.—C. V. Watkins.

Lauridsen, O. (1935). Hvilken rolle spiller graesmarksinfektionerne for en tuberkulosebekaempelse. [**Importance of Pasture Infection in Tuberculosis Control**].—*Maanedsskr. Dyrlaeg.* **46.** 541-544.

In three herds hitherto free from tuberculosis the author found reacting cows. The only opportunity for infection which seemed to be possible was that

of grazing on pasture bordering on land on which tuberculous herds were kept. The observations are used as an argument for a more extensive destruction of animals suffering from open tuberculosis.—H. C. BENDIXEN (COPENHAGEN).

RAUTMANN, H. (1935). Uebersicht über die Ergebnisse der Tuberkulosebekämpfung in der Provinz Sachsen im Jahre 1934. [**Results of the Tuberculosis Campaign in Saxony during 1934**].—*Dtsch. tierärztl. Wschr.* **43.** 353-359 and 373-376. 1 fig., 6 tables. [6 refs.]

The plan of campaign against tuberculosis in Saxony and the details of the herds, methods of diagnosis, control measures and recommendations are discussed at length.

It is the animal affected with open tuberculosis that is the chief menace and steps should first be taken to detect and remove such animals. Of 34,343 animals, 3,590 were found to be disseminating bacilli in the sputum, 310 others in their milk, 115 in vaginal discharges and 6 *via* the faeces. The significance of these results is discussed. The author advocates the adoption of the method of sputum examination as a primary measure in the case of herds not previously inspected. To indicate the menace of cases of open tuberculosis it is stated that, of 4,021 cases diagnosed by microscopic and bacteriological means, 3,815 appeared in normal health and only 206 caused any suspicion in the minds of the owners.

As an aid to diagnosis the complement-fixation test was carried out with the milk from 200 cows. Of 71 that gave positive readings, only 23 were found affected in the udder on *post-mortem* examination. 124 samples were negative, of which four came from tuberculous udders.

The intradermal tuberculin test is discussed at length and a description and illustration of a special type of syringe and needles for the purpose are given.

The article closes with recommendations for the general control of the disease, stress being again laid on the " open cases ". The tuberculin test is advocated where possible, especially as a routine measure in comparatively clean herds. Reference is made to the advantages accruing from the maintenance of a self-contained herd and the necessity of protecting calves and young stock from direct contact with older animals, contaminated food-stuffs and water supply. Abattoir statistics showed that of one thousand calves slaughtered four were affected with tuberculosis from birth. The majority are born free of the disease but if exposed to infection react to tuberculin eight to ten weeks later. Such calves should be slaughtered.—N. S. BARRON.

CARPANO, M. (1935). Sulla necessità d'intensificare in Egitto la lotta contro la tubercolosi degli animali domestici. [**Control of Animal Tuberculosis in Egypt**].—*Clin. vet., Milano.* **58.** 362-370. 1 table.

Tuberculosis is most prevalent in the north of Egypt, especially around the delta of the Nile. Buffaloes, camels and occasionally sheep and goats suffer from the disease as well as cattle. Up to the present, the only control measures adopted in Egypt have been limited to an inspection of meat at the public abattoirs. Now, however, preparations are being made to apply the tuberculin test on a large scale, and a scheme for the eradication of the disease has been presented to the Minister of Agriculture. This advocates the preparation of a district register of all susceptible animals and that the herds should be inspected and tuberculin tested periodically, with compulsory slaughter and compensation. It also covers the imposition of suitable regulations governing the conditions under which animals are kept, and also the production and transport of milk. This scheme could only be put into force gradually, and would require the voluntary and intelligent co-operation of livestock owners for its success to be assured.—J. A. N.

RUDDUCK, H. B. (1935). **Bovine Tuberculosis in Bovines.**—*Med. J. Aust.* Apr. 27th. 524-527. 5 tables.

The author discusses the incidence of tuberculosis in dairy cattle in Victoria, which is illustrated in tables. The general average percentage of reactors to the tuberculin test over 11 years was 6·3 and there does not seem to be any genuine decline in incidence ; this, however, is only to be expected from the control measures at present in use. The author then advances a scheme for gradual eradication along practical and economical lines. The scheme is to draw a quarantine line around Melbourne at such a distance as to include 20,000 cattle, apply the tuberculin test to all these cattle within 12 months and remove the reactors. Every year the tuberculosis-free area could be extended. This campaign would provide milk from non-reactors to the tuberculin test for half of the population of Melbourne for one year. It is suggested that the term " T.T.C." be used for milk from tuberculin-tested cattle owing to the vagueness of the term " T.B. tested milk " which is often misleading.—W. I. B. BEVERIDGE.

PLUM, N. (1935). **On Transmission of Tuberculosis by Copulation.**—*Skand. VetTidskr.* **25.** 301-309. [5 refs.] [In English : Swedish summary]. [*Verbatim* translation appears in *Maanedsskr. Dyrlaeg.* **47.** 209-215].

The author deals with a case of transmission by a bull which was later killed on account of tuberculous orchitis. Four cows served by the bull developed ulcerative and nodular processes in the vulva and in one case this was confirmed to be tuberculosis. He refers to the following :–

MAGNUSSON reported two herds in which three cows were infected in the same manner. It appears that the mucous membranes of the penis in the bull may be easily infected with tuberculosis. VELLING examined 21,888 bull calves and demonstrated primary tuberculous infection in four cases. The co-operative use of bulls is general in Denmark and, in view of the frequent occurrence of tuberculosis of the uterus and vagina in cows, it is reasonable to assume that tuberculosis of the penis in the bull is common.

RÖHRER considers that vulvar tuberculosis occurs either as elephantiasis of the vulva or as local nodules. He gives an account of an epidemic of vulvar tuberculosis in several cows, caused by a bull with primary tuberculosis of the penis. On *post-mortem* examination, tuberculosis was found in the penis but no clinical signs had been found anywhere in this animal. An account is given of a large number of heifers which had been covered by a bull affected with tuberculous orchitis. Among the animals covered by this bull, tuberculosis of the vulva was shown *post-mortem* in five cases and primary tuberculosis of the superficial inguinal lymph glands was demonstrated in ten heifers.—BRENNAN DEVINE.

RAUTMANN, H. (1935). Eine Studie über das Tuberkulosegeschehen mit besonderer Berücksichtigung der erbbiologischen Forschung und Folgerungen für die Rindertuberkulose-Bekämpfung. [**The Genetical Aspect of Tuberculosis**].—*Berl. tierärztl. Wschr.* **51.** 337-342. [28 refs.]

The author states in this study that, compared with human medicine, veterinary science shows a marked lack of knowledge in the genetical aspects of tuberculosis. Formerly, in pre-bacteriological days, it was thought to be a hereditary disease ; then the pendulum swung in the other direction. Possibly the truth lies between these two extremes. Tuberculosis is the product of the interaction of the causative agent, general influences and the constitution of the animal. It is a much debated point as to how far a specific tendency towards tuberculosis can be inherited. It is possible for parents to have a predisposition but never to have come into contact with infection. The searching of herd

registers is of doubtful value in this direction. During the war, 5·7 per cent. of British soldiers contracted tuberculosis, but among Africans 56 per cent. suffered from it. This difference was due to the presence, or absence of, acquired resistance.

Since no specific disposition to tuberculosis is inherited, but only a constitutional anomaly which makes infection easy, weak animals and those affected with tuberculosis should not be used for breeding. Animals free from tuberculosis and those which have gained resistance from exposure should, on the other hand, be used. All possible steps should be taken to increase the bodily resistance of animals to the disease.—A. W. N. Pillers.

Ananiadés, B. (1935). Tuberculination et bacillémie tuberculeuse chez les bovidés. **[Tuberculin Testing and Tuberculous Bacillaemia in Cattle].**—*C. R. Soc. Biol. Paris.* **119.** 265-266. [3 refs.]

The author attempted to demonstrate bacilli in the blood of 15 clinically tuberculous cattle, after they had reacted to tuberculin, and of five other cows 24 hours before and 24 hours after they had reacted to tuberculin. Subcutaneous inoculation into guinea pigs and culture by the method of Löwenstein on Petragnani's medium with asparagin gave negative results. He concludes that neither subcutaneous nor intradermal introduction of tuberculin can provoke a tuberculous bacillaemia in naturally diseased cattle.—C. V. Watkins.

Schalk, A. F., Roderick, L. M., Foust, H. L., & Harshfield, G. S. (1935). **Avian Tuberculosis. Collected Studies.**—*Tech. Bull. N. Dak. agric. Exp. Sta.* No. 279. pp. 46. 1 fig., 18 tables. [23 refs.]

This bulletin records experiments made in an epidemiological study of avian tuberculosis in birds and various mammals. A large proportion of the experimental cattle exposed with tuberculous fowls in yards developed hypersensitiveness to avian tuberculin, giving positive reactions to both the intradermal and subcutaneous tests. They did not give positive reactions to mammalian tuberculin. The sensitiveness of such cattle to avian tuberculin disappeared within a few months of the termination of exposure. The testing with avian tuberculin of 507 cattle which had passed through the yards of the Armour Packing Company resulted in positive reactions in 15·6 per cent. of the animals, from which it is concluded that the use of avian tuberculin for the diagnosis of Johne's disease might be misleading. It was very seldom that the cattle developed gross evidence of infection.

93·7 per cent. of pigs kept in boxes below tuberculous fowls, so that their feed was contaminated by the birds' droppings, developed localized tuberculous lesions in the submaxillary and mesenteric lymph glands. Pigeons and sparrows did not appear very susceptible to infection from poultry under the conditions of the experimental exposure, but they were found capable of carrying the infection from an infected group of fowls to a healthy group, probably acting as mechanical carriers. Rats, house mice and field mice were found to be resistant to avian tuberculosis, but white rats were mildly susceptible. Common rats were found capable of acting as mechanical carriers under the conditions of the experiments.

Avian tubercle bacilli were found to remain viable in carcasses buried three feet deep for at least two years, and they survived in the litter and soil of the experimental barnyard after four years. In runs without much accumulation of litter they were found to survive for at least one year.

An examination of the blood of infected fowls, by injecting 10 c.c. into normal chickens, revealed a blood infection in about 40 per cent. of the tuberculous birds. An investigation into the natural resistance of young chickens showed that they were susceptible, and the chronic nature of the disease was demonstrated by the survival of diseased birds for four years and four months after the detection of infection by the tuberculin test.

No success was obtained in attempts to eradicate the disease in fowls by eliminating reactors to tuberculin tests carried out either annually or twice annually, and it is pointed out that little success can be expected from this method unless it is combined with movement to clean runs, as the bacillus is capable of prolonged survival in soil.—U. F. RICHARDSON.

ANANIADÈS, B. (1935). Recherches sur la bacillémie tuberculeuse chez l'homme et les animaux par la méthode de Loewenstein. [**Research on Tuberculous Bacillaemia in Animals and Man by Löwenstein's Method**].—*Rev. Path. comp.* **35.** 1057-1062. [9 refs.]

Following Löwenstein's method, Ananiadès has been able to isolate acid-fast bacilli from nine out of 45 samples of blood from tuberculous hospital patients, one out of seven patients affected with rheumatism and none of 14 cases of dementia praecox. They were also obtained from one out of 12 guinea pigs with generalized tuberculosis and from five out of 12 which had been shocked with milk powder or gonacrine. They were not obtained from any of five clinically tuberculous cows even after the injection of tuberculin subcutaneously or intradermally.—A. W. S.

ABELS, H. (1935). Zur Frage der Tuberkuloseschutzimpfung mit BCG. Prüfung der Unschädlichkeit und Wirksamkeit beim Geflügel. [**BCG Vaccination in Fowls**].—*Tierärztl. Rdsch.* **41.** 497-501 and 515-518. 1 table. [23 refs.]

The author first discusses the findings of other workers on the problem of BCG immunization in poultry and then describes his own work in this respect.

The inoculation material used was obtained, with instructions, from CALMETTE and consisted of cultures of BCG prepared from avian strains. As a preliminary experiment, massive doses were given to some and repeated smaller doses to the remainder of a total of 13 chickens, 3 pullets, 20 hens, 1 pigeon and 3 parrots. Those given the dose orally received a total of 225 mg. of culture, those receiving it subcutaneously 75 mg., those intramuscularly 10 mg., and those intravenously 5 mg. Although slight local lesions developed in those individuals injected with the culture, such lesions tended to retrogress rapidly. No other lesions of tuberculous origin were found in any of this group during the course of two and a half years. It was noteworthy that all the birds developed allergy and reacted to the tuberculin test except those that received culture *per os*.

Abels isolated living bacilli from the organs of birds 15 months after inoculation, which is in agreement with the findings of other investigators who have recorded their recovery after one year unassociated with any pathological changes. Further experiments refer to the administration of graded doses of BCG culture to groups of birds with a view to testing its immunizing power. Such groups were fed with virulent culture and infected tissue and put in contact with sick birds from one to four months after receiving the " vaccine ". Records were kept over a period of two years and three months. A table of the results is given which shows that the vaccinated birds fared worse than the controls. No evidence of protection could be deduced, the former having apparently become sensitized.

The author draws attention to the slow rate at which lesions develop in fowls when infection is *per os*, whether it is given direct or allowed to occur from contact [delay of many months]. In one instance it took nine months before the first bird in a batch, which had been placed in contact with open cases, showed clinical symptoms and one and a half years before the first one died. These circumstances have an important bearing on any experiments carried out on such lines as the above and must be borne in mind when control measures in the field are under consideration.—N. S. BARRON.

VERGE, J. (1935). Les maladies communes à l'homme et aux animaux. VIII. Le rôle du bacille bovin dans l'étiologie de la tuberculose pulmonaire humaine. [**Diseases Transmissible from Animals to Man. VIII. The Role of the Bovine Type of Bacillus in the Aetiology of Human Pulmonary Tuberculosis**].—*Rev. gén. Méd. vét.* **44.** 464-467. 2 tables. [12 refs.] [For abst. of previous articles of this series, see this *Bull.* **5.** 491].

The author discusses, giving data in support, the presence of tubercle bacilli of the bovine type in the sputum of persons suffering from pulmonary tuberculosis. He declares that, while the dangers of cutaneous and peroral infection are generally recognized, little attention is paid to infection *via* the respiratory tract; hence the danger of close association with tuberculous animals in infected stables is apt to be overlooked.—M. BURKE.

TOBIESEN, F., JENSEN, K. A., & LASSEN, H. C. A. (1935). Bovin lungetuberkulose. [**Pulmonary Tuberculosis in Man caused by the Bovine Type of** *Mycobact. tuberculosis*].—*Ugeskr. Laeg.* **97.** 293-300. 2 tables. [21 refs.]

In the course of two and a half years, 26 cases of pulmonary tuberculosis in man caused by the bovine type of *M. tuberculosis* have been demonstrated in Copenhagen; in none of them was there contact with other human cases. Ten of these patients were under 5 years old; 8 were between 5 and 15, and 8 were over 15 years old; none of the latter was more than 32 years old. The evidence seems to indicate that the infection was of alimentary origin. Thirteen out of the 25 patients had consumed raw milk. Pulmonary tuberculosis caused by the bovine type of organism seems to be as serious as that caused by the human type, as far as the incidence in children under five years old is concerned.

—H. C. BENDIXEN (COPENHAGEN).

HEIDELBERGER, M., & MENZEL, A. E. O. (1935). **A Complex Polysaccharide Fraction from the Cells of the Human Type of Tubercle Bacillus, H 37.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 1150-1151. 1 table. [4 refs.]

A specific polysaccharide was isolated from *Mycobact. tuberculosis*, avoiding precipitation from alkaline solutions. From the final product, which contained 93·3 per cent. of reducing sugars on hydrolysis, a magnesium palmitate was isolated. The possibility that this substance is an integral portion of the polysaccharide complex is discussed.—R. E. GLOVER.

PLUM, N. (1935). **Modification of the Virulence of Tubercle Bacilli.**—*Skand. VetTidskr.* **25.** 397-472. 1 table. [129 refs.] [In English: Swedish summary].

The author devotes 29 pages of this article to a review of the literature, mainly with the purpose of showing the divergent views regarding the relationship existing between the three types of tubercle bacilli. A survey of the cultural properties of tubercle bacilli is also given, and comments are made on the methods adopted for differentiation purposes. In the author's own experiments he used guinea pigs, rabbits and hens principally for differentiation purposes, taking the view that if tubercle bacilli "show virulence for guinea-pig in two successive generations after subcutaneous inoculation it generally means that the bacilli possess mammalian virulence, whereas the corresponding virulence for fowls indicates that the tubercle bacilli in question are of avian type".

Experiments are cited supporting this statement. The rabbit, being susceptible to all three types of tubercle bacilli, is used for the purpose of carrying the bacilli over to the next generation. The author describes experiments in which the aim has been to modify avian tubercle bacilli and to render them virulent for guinea

pigs. The technique adopted is to inoculate guinea pigs, then rabbits from the guinea pigs to maintain the strain, and guinea pigs again from the rabbits and so on. If any strain showed virulence for guinea pigs through two generations, the author felt justified in assuming that they had acquired bovine virulence (authorities given). In a few experiments the results were checked with calf inoculation. The reverse procedure was adopted in endeavouring to modify bovine tubercle bacilli and confer on them avian characters.

The experiments described in the article indicate that the author, using this technique, achieved some success in modifying the virulence of both avian and bovine bacilli. The precautions taken to avoid a spontaneous natural infection seem to be reasonably sound.—H. G. LAMONT.

I. RISLAKKI, V. (1935). Bovini-tyyppisen tb-bakteerin viljelemisestä glyseriini-pitoisella ja glyseriinittömällä elatusaineella. [**The Cultivation of the Bovine Tubercle Bacillus on Media with and without Glycerin**].—*Suom. Eläinlääkäril.* **41.** 62-68 and 85-88. 1 table.

II. RISLAKKI, V. (1935). Die Züchtung des bovinen Tbc.-Bakteriums auf glyzerinhaltigem und glyzerinfreiem Nährboden. [**The Cultivation of the Bovine Tubercle Bacillus on Media with and without Glycerin**].—*Z. InfektKr. Haustiere.* **48.** 1-13. 4 tables. [10 refs.]

[Abst. done from II which covers the ground dealt with in I.—Ed.]

Rislakki has compared the value of Löwenstein's medium, with and without the addition of 0·75 per cent. glycerin or 1·5 per cent. tuberculin, for the isolation of *Mycobact. tuberculosis* from a series of 75 samples of bovine material which contained various numbers of organisms all of which were, however, microscopically positive. The material used was first treated with 5 per cent. sulphuric acid for ten minutes at room temperature, diluted and centrifuged, and six tubes of each medium were sown. After three weeks' incubation, 41 samples already showed growth on the medium which contained no glycerin whilst only 21 and 33 samples respectively had grown on the media containing glycerin and tuberculin. Moreover, at the second reading the glycerin and tuberculin-free medium showed, with few exceptions, the best growth.

The accepted view that glycerin does not favour the growth of the bovine type of *M. tuberculosis* was thus confirmed, and it was shown that in Löwenstein's medium even as little as 0·75 per cent. inhibits growth. Tuberculin assists growth if it contains no glycerin. At the final reading 66 of 75 samples of material were positive. The failures are ascribed to frequent contamination and to a curious souring (pH 6·0) of the medium, which was apparently unassociated with bacterial action and which also resulted in the medium becoming transparent.—A. W. S.

SANDOR, G., & SCHAEFER, W. (1935). Etude de l'antigène résiduel des filtrats de culture des bacilles tuberculeux sur milieu synthétique. [**The Residual Antigen of Filtrates from Cultures of Tubercle Bacilli on Synthetic Media**]. —*Ann. Inst. Pasteur.* **55.** 163-174. 4 tables. [11 refs.]

In the mixture of substances precipitated from filtrates of cultures of tubercle bacilli in synthetic media by means of ammonium sulphate, the polysaccharides and protein fractions both fix complement in the presence of tuberculous sera. Fractionation of the polysaccharides by means of methyl alcohol results in the separation of a small, very active fraction from a large mass of inert polysaccharides. After hydrolysis the inert fraction has a very high reducing power ; that of the active portion varies but is often low. From these experiments and others previously carried out, it is concluded that the haptens of tubercle bacilli are probably extremely active substances which form but a minute fraction of the cells and

have physical and chemical qualities of their own, distinct from those of the large inert portion. Reasons for believing that bacillary haptens are possessed of a very great surface activity – adsorbability – have been put forward in an earlier paper [SANDOR, G. (1935). Contribution à l'étude des antigènes des microbes pathogènes. – Paris : G. Doin et Cie.]. In view of the fact that they are easily adsorbed and exist in minute quantities, their isolation is difficult and we do not yet know with certainty the exact chemical nature of haptens of either a lipoidal or polysaccharide nature.—A. W. STABLEFORTH.

SCHAEFER, W. (1935). Sur un type particulier de bacilles acido-résistants isolés de l'organisme du cobaye. Caractères culturaux et biologiques. [**Cultural and Biological Characters of an Acid-Fast Bacillus Isolated from the Guinea Pig**].—*C. R. Soc. Biol. Paris.* **119.** 1086-1088. [4 refs.]

The author records the isolation from a guinea pig of an acid-fast organism the appearance of which in young cultures was indistinguishable from avian strains of tubercle bacilli. The organism was non-pathogenic for fowls. Guinea pigs inoculated with 10 mg. of a culture of the organism reacted to tuberculin. The organism may be distinguished from avian tubercle bacilli by its colony formation on Löwenstein's medium and by the presence of a specific antigen. —T. M. DOYLE.

SICKMÜLLER, E. (1935). Paratuberkulose und Tuberkulose. [**Johne's Disease and Tuberculosis**].—*Arch. wiss. prakt. Tierheilk.* **69.** 358-362. [3 refs.]

Sickmüller describes a case of coincident tuberculosis and Johne's disease in a bovine. Caseated lesions were present in the lungs and in one mesenteric gland and both showed acid-fast bacilli which were regarded as *Mycobact. tuberculosis.* The intestine showed lesions which were typical of Johne's disease. Smears from this and from a swollen and juicy but otherwise normal mesenteric lymph gland showed shorter, less deeply stained acid-fast bacteria in definite clumps which were regarded as *M. paratuberculosis.* Material from the lungs and caseated mesenteric gland caused generalized tuberculosis in guinea pigs and produced typical growths of the bovine strain of *M. tuberculosis.* Material from the intestinal lesions and macroscopically normal lymph gland caused localized tuberculosis in guinea pigs. Further inoculations and cultures confirmed the tuberculous nature of these lesions. Cultures from the apparently normal lymph gland and from the guinea pigs inoculated with intestinal material both developed unusually slowly in the first generation. No attempt was made to isolate *M. paratuberculosis.* It is suggested that tubercle bacilli may often be present in intestines and glands which appear typical of Johne's disease, and that the real nature of growths obtained should be tested by animal inoculation.—A. W. STABLEFORTH.

HAGAN, W. A., & ZEISSIG, A. (1935). **Recovery from Johne's Disease. Report of a Case.**—*J. Amer. vet. med. Ass.* **87.** 199-206. 6 figs. [1 ref.]

Three heifers about nine months old were drenched with infective material from lesions of Johne's disease. One of these showed marked symptoms of the disease 11 months later and died after a further two months. Another first showed symptoms about 23 months after the date of infection, shortly after its first calving, and died two months later. The third, which forms the main subject of the report, also showed marked symptoms but recovered. This heifer first showed symptoms 21 months after infection and about six weeks after its first calving, and these soon became marked : it had in the meantime been served again. A piece of rectal mucosa showed typical acid-fast bacteria. There was some recovery during the following spring but, following the birth of the second calf, marked symptoms

again showed for about six weeks. At about three and a half years the weight was only 650 lb. and the animal appeared to be dying, but it began to recover and within six months weighed 1,350 lb. It continued in good condition and was slaughtered when just over nine years of age, five years after the last symptoms had been shown. The only lesions present were in a small area in the caecum in which there were numerous typical acid-fast organisms. These were also found in small numbers in smears of the ileum and several lymph glands. The animal reacted to tests with johnin and avian tuberculin regularly from the 13th month for about two and a half years, when the results became erratic. Complement-fixation was positive from about the 21st month until the animal was slaughtered.

The authors point out the danger from animals which, like this one, apparently recover but are excreting the causal bacteria, and support the view that probably many animals become infected and recover without showing marked symptoms.
—A. W. Stableforth.

Dunkin, G. W., & Balfour-Jones, S. E. B. (1935). **Preliminary Investigation of a Disease of Sheep Possessing Certain Characteristics Simulating Johne's Disease.**—*J. comp. Path.* **48.** 236-240. [3 refs.]

Outbreaks of disease in sheep possessing certain characteristics simulating Johne's disease in cattle have recently been recognized by several workers. The cases investigated by the authors were drawn from an outbreak originally reported by Johnston [(1933). *Vet. Rec.* **13.** 1388]. The earliest symptom noticed was that the affected animals separated themselves from the remainder of the flock and refused to feed. Diarrhoea soon supervened, and was followed by emaciation and anaemia and by death after varying intervals. A curious feature in advanced cases was the fact that the wool could be removed in masses by merely rubbing the hand along the back, leaving the skin bare.

Double intradermal tests on one of the affected animals resulted in positive reactions to ordinary johnin, synthetic medium johnin and avian tuberculin, but not to ordinary tuberculin. *Post-mortem* examination of this animal revealed slight and patchy thickening of the intestinal wall, particularly of the ileum, and smears from various places showed large numbers of acid-fast organisms. Acid-fast organisms were also present in smears from the mesenteric glands which were slightly enlarged and oedematous. Media inoculated from material treated with antiformin were apparently sterile after five and six months, but at seven months a few minute colonies were present on three out of 12 tubes of the medium ordinarily used for obtaining growths from cases of bovine Johne's disease. No growth was obtained on plain egg. Sub-cultures grew at first with relative rapidity and were evident to the naked eye at three weeks, but thereafter increased little.

One obviously affected animal completely recovered without treatment of any kind. Details are given of the various species and numbers of worms present in this and other affected animals, and it is suggested that they may have played a part in the causation of the disease. The features contrasting most strongly with Johne's disease of cattle were the complete inappetence present in advanced cases, the lack of marked diarrhoea although the usual pellet formation was absent, and the absence of corrugation or even marked thickening of the intestine.—A. W. S.

Merchant, I. A. (1935). **A Study of the Corynebacteria Associated with Diseases of Domestic Animals.**—*J. Bact.* **30.** 95-116. 12 figs. on 1 plate, 5 tables. [Numerous refs.]

The author shows that there are distinct morphological, cultural and serological differences from which the four species, *Corynebact. pyogenes*, *C. pseudotuberculosis ovis*, *C. renalis* and *C. equi* can be distinguished.

"The most distinctive characteristics of *C. pyogenes* are: morphology; aerobic as well as anaerobic growth; reproduction only in media containing blood, blood serum or milk; haemolysin production; coagulation of milk with subsequent digestion of the curd; liquefaction of gelatin and coagulated blood serum; production of acid in glucose, levulose, galactose, mannose, sucrose, lactose, maltose and dextrin and by some strains, in zylose.

"*C. pseudotuberculosis* grows in dry granular colonies; does not alter milk, gelatin nor coagulated blood serum; produces acid in glucose, levulose, mannose, sucrose and maltose.

"*C. renalis* grows in moist isolated colonies; digests milk casein producing an alkaline reaction but has no action on gelatin nor solidified blood serum. It ferments glucose and some strains also ferment levulose and mannose.

"*C. equi* is characterised by its ability to produce a red-colored pigment, its profuse viscid growth, reduction of nitrates and inability to ferment carbohydrates.

"*C. pseudotuberculosis* and *C. renalis* are the only two of the four to show a marked serological relationship.

"Orange-coloured variants were isolated from three cultures. These variants resembled their parent cultures in morphology but were smooth and pigmented and failed to ferment carbohydrates whereas the parent cultures were usually rough, cream-colored and demonstrated some fermenting ability."

—Gwilym O. Davies.

Giudice, R. (1935). Comportamento del bacillo del mal rossino nei terreni biliati. [**Behaviour of the Swine Erysipelas Bacillus on Bile Medium**].—*Profilassi*. **8.** 46-49. 2 tables. [8 refs.] [Abst. from English, French and German summaries].

When growing in bile or bile broth the individuals of *Erysipelothrix rhusiopathiae* appear larger than usual and do not form long chains; they preserve their staining, biological and cultural characteristics. They live in bile for 40 days but are dead by the 55th day. The author comments on the divergent results obtained by different authors.

Dobberstein, J. (1935). Beiträge zur Pathologie des Zentralnervensystems beim Pferde. II. Encephalitis Malleosa beim Pferde. [**The Pathology of the Central Nervous System of the Horse. II. Glanders of the Brain**].—*Berl. tierärztl. Wschr.* **51.** 545-546. 2 figs. [2 refs.] [For abst. of previous article of this series, see this *Bull.* **4.** 649].

The author describes a lesion in the brain of a nine-year-old mare which was destroyed on account of glanders. Typical lesions were found in the lungs, larynx, nasal septum, etc. The meninges of the brain were hyperaemic and on cutting into the cerebrum a soft, discoloured area was disclosed on its dorsal surface. On microscopic examination, this lesion was found to be composed of a dense accumulation of red blood corpuscles, leucocytes and histiocytes. Ganglion cells were not present, but there was activation and mobilization of the glia cells. In the peripheral zone, numbers of large round cells with a honey-combed protoplasm were present, endothelial and adventitial cells were numerous and active, and the capillaries were dilated. There was no typical granuloma formation and the lesion was undoubtedly of haematogenous origin.—J. A. Nicholson.

Philip, C. B., Jellison, W. L., & Wilkins, H. F. (1935). **Epizootic Tick-Borne Tularemia in Sheep in Montana.**—*J. Amer. vet. med. Ass.* **86.** 726-744. 3 figs., 4 tables. [3 refs.]

The authors describe an outbreak of disease which occurred in a flock of 1,320 yearling ewes in Montana. Symptoms appeared about eight to ten days following the removal of the flock from winter to summer range; approximately 40 per cent. were affected and 200 died before the epizootic subsided. It was noted that the outbreak was associated with an unusually heavy infestation of the sheep by ticks (*Dermacentor andersoni*) and there was in addition a coincident

mortality among tick-infested jack rabbits [a species of wild rabbit, *Lepus campestris*]. Laboratory examinations revealed the presence of *Pasteurella tularensis* in the tissues of five of six affected sheep, and of two of 18 dead or killed jack rabbits. The organism was also recovered from 12 out of 19 samples of ticks from affected sheep, and from six out of 24 samples of ticks from dead or killed jack rabbits.

Serological tests were carried out and positive agglutinating titres were met with in the case of the sera from 26 out of 32 animals examined. All animals were apparently affected and it is noted that the titres corresponded roughly to the stage of illness or of recovery.

The authors record that *Past. tularensis* was not recovered from unfed ticks collected locally and, in spite of repeated exposure to infected carcasses and ticks, none of the investigators, employees or owners contracted infection.—D. R. W.

Hoffman, H. A. (1934). **Fowl Cholera.**—*Mon. Bull. Calif. Dep. Agric.* **23.** 136-140. 2 charts.

The disease is stated to be wide-spread in the United States of America, especially in New York, New Jersey and parts of California. 2·2 to 3·7 per cent. of the *post-mortem* examinations reveal this condition.

Outbreaks usually occur after the birds are sexually mature and they are more frequent in winter and spring months. The author mentions that certain strains of *Pasteurella aviseptica* are less active than others in their ability to produce disease. These weaker strains may become localized in various parts of the body, causing abscesses. Such infections are found in the wattles, beneath the sternum, in the air sacs, in the lungs or in the feet.

The mode of spread of the disease and the control measures recommended are detailed.—Norman Dobson.

I. Barboni, E., & Tolomei, F. (1935). L'anatomia patologica delle forme acute e acutissime del colera aviare. [**Pathology of Acute Fowl Cholera**]. —*Clin. vet., Milano.* **58.** 281-291. 8 figs. on 2 plates. [14 refs.]

II. Barboni, E., & Arangio, A. (1935). L'anatomia patologica delle forme acute e acutissime del colera aviare. Nota seconda. Il cervello e le sue meningi, i reni, l'intestino, la milza e il pancreas. [**Pathology of Acute Fowl Cholera. II. Brain, Kidneys, Intestines, Spleen and Pancreas**].—*Ibid.* 441-452. 8 figs. on 2 plates. [23 refs.]

I. The authors have studied the macroscopic and microscopic changes in the hearts and livers of 12 Leghorn fowls which had died from acute fowl cholera. Pericardial fluid was always present in excess, the heart muscle was swollen, intensely congested and sometimes contained small haemorrhages. In two cases, necrotic foci were present in the epicardium together with an accumulation of a gelatinous substance. All the livers were congested and oedematous ; fatty degeneration was present and in some cases necrotic foci in various stages of gelatinous degeneration were also seen. In these cases, the gelatinous material often invaded the neighbouring parenchyma. Small haemorrhages were also sometimes present on the surface of the liver. The portal vessels frequently contained thrombi formed of closely packed erythrocytes which also showed various stages of gelatinous degeneration ; a perivascular inflammatory infiltration was also present. The changes in the liver may, in short, be described as a degenerative or necrotic parenchymatous hepatitis.

II. A detailed pathological examination of material collected from 18 cases of acute fowl cholera has been carried out, the results of which may be summarized as follows. The dura mater always appeared normal, but the pia mater and the brain showed inflammatory changes consisting of vascular congestion and the

extravasation of fluid, containing neutrophile and mononuclear cells, into the surrounding tissues. Inclusion bodies were never observed. The kidneys were swollen, soft and greyish-red in colour with small pin-point haemorrhages under the capsule, and microscopic examination revealed the presence of an acute glomerulo-nephritis. All the blood vessels were congested, some contained emboli and there were scattered haemorrhages in Bowman's capsule and the glomeruli and degeneration of the vessel walls. In addition, the tubules were dilated, their epithelium swollen and albumin casts were often found in them which, together with degeneration of the interstitial cells, were the chief changes seen in the kidneys. The spleen was always slightly enlarged, reddish-brown in colour and showed changes typical of a splenic infection. The whole of the small intestine was affected by an acute catarrhal enteritis, the lesions being most pronounced in the duodenum and usually localized to the mucous membrane or submucous layer. Finally, the pancreas was oedemic and congested and degenerative changes which never involved the islets of Langerhans were constantly present.—J. A. NICHOLSON.

BRAGA, A., & LOMBARDO, A. (1934). Sôbre a presença do Bacilus proteus no sangue dos bezerros com diarrhéa. [**Presence of *Proteus vulgaris* in the Blood of Calves affected with Diarrhoea**].—*Rev. Dep. nac. Prod. anim. Brazil.* **1.** 41-48. 1 table. [6 refs.] [English and French summaries : abst. from orig.]

Blood cultures were obtained from 17 calves in different parts of Brazil, suffering from pneumo-enteritis, and with one exception these gave positive results, pure cultures of *P. vulgaris* being obtained in eight instances and a mannite-fermenting *Salmonella* in the remainder. A similar attempt to obtain a blood culture was made on a healthy calf [presumably as a control], the result being negative. The strains isolated were distinctly pathogenic for guinea pigs.—R. S. ROBERTS.

SMITH, F. R., & HENDERSON, J. L. (1934). *E. coli* **in Mastitis with Accompanying Changes in Milk Composition.**—*J. Dairy Sci.* **17.** 799-803. 1 table. [13 refs.]

The authors describe a case of acute mastitis caused by a toxic strain of *Bact. coli*. A Jersey cow had been giving 11 lb. of milk per milking and the milk yield dropped to 1 lb. within 12 hours, the animal showing severe constitutional disturbance, loss of appetite, cessation of rumination, constipation, a temperature of 107° F., etc. The left hind quarter of the udder was swollen, hard, hot and painful. Microscopic examination showed a large number of Gram-negative rods. Cultural tests proved these to be a strain of *Bact. coli* which produced a toxic condition when inoculated subcutaneously or intraperitoneally into four guinea pigs, two of which died in 16 hours. In the cow, the infection remained localized to one quarter, but all quarters showed increased leucocytes, lowered lactose, high pH and conductivity. Within four days milk secretion had practically ceased.—A. W. S.

MOUCHIN, P. (1934). **Paratyphoid Infection in Piglets.**—*Sovyet. Vet.* No. 11. pp. 37-43. 2 tables. [Abst. from French summary].

The author found paratyphoid infection to be the most common contagious disease of piglets in White Russia during the years 1931 to 1933, enzootics occurring from February to March. Various paratyphoid bacteria were involved. Superimposed infections by other members of the group were noted in some cases. Some outbreaks were atypical clinically and pathologically. Pneumonia was more often found than the bowel lesions which are generally considered inevitable. Various sera (" aolin " and " lactobacilline ") failed ; prophylaxis should therefore be based upon correct zootechny and sanitary measures.—C. V. WATKINS.

Zalenskaja, M. J., & Fedorowa, O. G. (1934). **The Aetiology of Piglet Paratyphoid.**—*Sovyet. Vet.* No. 11. pp. 43-48. [Abst. from French summary].

The authors examined 64 piglets and material from 26 others that were clinically affected with paratyphoid, and collected information regarding these outbreaks on the farms. The possibility of loss of the piglets, with paratyphoid as a complication only, was excluded to the extent that this was possible by means of epidemiological, clinical and anatomo-pathological examinations. In 30 cases bacteria of the coli-typhoid-paratyphoid group were isolated, especially *Salmonella cholerae-suis*, while *S. paratyphi* B (several cases), *Proteus vulgaris* (one case), *Erysipelothrix rhusiopathiae* (one case) and undetermined bacteria (two cases) were also found. The authors are of the opinion that examination of this group of bacteria should be based upon endogenous microbial dissociation, which influences growth changes (R and S colonies), as well as serological and all other biological and biochemical properties. They link up the epidemiology of the condition with bad hygiene.—C. V. Watkins.

I. van Roekel, H. (1935). **Present Status of Pullorum Disease.**—*12th Int. vet. Congr. 1934.* **3.** 92-107. 1 table. [14 refs.] [French, German and Spanish summaries].

II. Wagener, K. (1935). Kückenruhr. [*Salmonella pullorum* **Infection**].—*Ibid.* 108-131. [Numerous refs.] [English, French and Spanish summaries : abst. from orig. in German].

I. This report contains no new information but is a concise review of modern knowledge of the disease. Considerable progress in eradication is reported from certain parts of the United States of America.

II. A large volume of literature concerning this disease is reviewed. No new data is presented, but the author emphasizes the need for the standardization of every agent and every procedure connected with the diagnostic agglutination test. He also notes that, whilst state intervention is a necessary corollary to successful eradication, the more important factor is the whole-hearted co-operation of all poultry farmers.—E. J. Pullinger.

Wynohradnyk, V., & Pelimon, C. (1935). Observatiuni asupra frecventei infectiunii cu diarea albă bacilară la păsări adulte. [*Salmonella pullorum* **Infection in Rumania**].—*Arhiva vet.* **26.** 243-253. 3 tables. [8 refs.] [Abst. from French summary].

During 1934, examinations were made of 19,084 samples of blood taken from fowls on 52 farms. Both rapid and slow types of agglutination test were used, the latter proving slightly more satisfactory. Rhode Island Reds were more susceptible than White Leghorns. Hens over one year old were affected more frequently than younger birds and than cocks.

No specific agglutinins were found in blood taken from 56 geese nor in samples taken from 446 ducks. They were, however, found in blood from turkeys.

Control of the disease by repeated agglutination tests leads to a decrease in infection, if immediate elimination of infected and suspected birds is carried out, combined with general hygienic precautions.

Pacheco, G., & Rodrigues, C. (1935). Nouveau représentant des bactéries du groupe *pullorum-gallinarum*. Morphologie des colonies du groupe. [**Morphology of Colonies of the** *pullorum-gallinarum* **Group of Salmonella**].—*C. R. Soc. Biol. Paris.* **118.** 905-907. [7 refs.]

Thirty-seven strains of the *pullorum-gallinarum* group were studied and several possessing certain atypical characters were termed " intermediate " type. In this

type the morphology and serological properties were similar to those of the group ; the production of H_2S was feeble, but varied with the medium employed ; dulcite was fermented rapidly, maltose, sorbite and rhamnose slowly, and xylose not at all. Identification of the members of the group was not possible by means of any of the selective media used, but a rapid differentiation was possible using a modification of Drigalski's medium. *Salmonella pullorum* gave colourless colonies, whereas colonies of *S. gallinarum* and of the intermediate type were red. Secondary colony formation was noted in Drigalski's medium.—J. E. Wilson.

Pacheco, G., & Rodrigues, C. (1935). Biologie des bactéries du groupe pullorum-gallinarum. Action sur les milieux au lait et sur le rouge neutre. [**Biology of the *pullorum-gallinarum* Group. Reaction on Milk and Neutral Red**]. —*C. R. Soc. Biol. Paris.* **118.** 1019-1022. [7 refs.]

The authors state that milk media are of little value for distinguishing between *Salmonella pullorum* and *S. gallinarum* and also for distinguishing between the so-called five types of the *pullorum-gallinarum* group. The five types referred to are the gas-producing and non-gas-producing strains of both species together with an intermediate type. They found, however, that by the addition of neutral red to certain simple media (details of which are given) it was possible to distinguish these types, as neutral red not only indicates the production of acidity but also gives rise to a greenish fluorescence with the gas-producing strains.—G. O. Davies.

I. Pacheco, G., & Rodrigues, C. (1935). Biologie du groupe *pullorum-gallinarum*. Capacité sulfurigène. [**Biology of the *pullorum-gallinarum* Group of Bacteria. H_2S Formation**].—*C. R. Soc. Biol. Paris.* **119.** 888-889. [4 refs.]

II. Pacheco, G., & Rodrigues, C. (1935). Biologie du groupe *pullorum-gallinarum*. Fermentation des sucres. [**Biology of the *pullorum-gallinarum* Group of Bacteria. Fermentation of Sugars**].—*Ibid.* 889-890. [2 refs.]

In these publications the authors show that the *pullorum-gallinarum* group of organisms can be placed into four groups on the basis of H_2S production and the fermentation of sugars. The results are summarized in the following table :–

	S. pullorum. Gas +	*S. pullorum.* Gas –	Intermediate type.	*S. gallinarum.*
Lead agar ...	H_2S (rapid)	H_2S (rapid)	H_2S (slow)	H_2S (rapid)
Bismuth agar ... (with or without cystine).	—	—	—	H_2S (rapid)
Iron agar ...	H_2S (rapid)	H_2S (rapid)	—	H_2S (slow)
Gelatin ...	H_2S (rapid)	H_2S (rapid)	H_2S (slow)	H_2S (slow)
Xylose	+	+	—	+
Dulcite	—	—	+	+
Sorbite	+	+	+	—
Maltose ...	—	—	+ (slow)	—

—Gwilym O. Davies.

Kriegbaum, A. (1935). Infektion vom Dachs (Meles meles) mit Bakterium pullorum Rettger. [*Salmonella pullorum* **Infection in the Badger**].—*Münch. tierärztl. Wschr.* **86.** 439-440. [11 refs.]

The author describes a case of *S. pullorum* infection in a full-grown male badger, which was one of several found dead on an estate in Upper Bavaria. The *post-mortem* findings included, among many others, the characteristic feature of septicaemia, and showed a complete absence of external injuries. A microscopic examination revealed the presence in the spleen, and in some cases in the other organs, of Gram-negative, delicate ovoid non-motile bacteria. These were isolated and submitted to cultural, biochemical and serological examination which showed them to be *S. pullorum*.

The origin of infection could not be traced, but the author suggests that perhaps illness ensued as a result of the ingestion of a fowl infected with *S. pullorum*.

—M. Burke.

Hornus, G. (1935). Structure antigénique et classification des bacilles du groupe des salmonella. [**Antigenic Structure and Classification of the Salmonella Group**].—*Rev. Immunol.* **1.** 488-500. 2 tables. [Numerous refs.]

This is a dissertation on the report of the Salmonella Subcommittee of the Nomenclature Committee of the International Society for Microbiology [see this *Bull.* **5.** 63]. The suggested definition and classification of the genus *Salmonella* are given, together with explanations of the various antigenic differences on which the classification is based. The paper does not lend itself to abstraction.

—Gwilym O. Davies.

Bardanzellu, G. M. (1934). Su di un caso di infezione da *Brucella melitensis* nei bovini. [*Br. melitensis* **Infection in a Bovine**].—*Boll. Ist. Zooprofil. Sper., Turin.* March. pp. 21-27.

The author records a case of undulant fever in a 30-year-old woman who was in the habit of milking the cows and making butter. The cows were kept in the same shed as a flock of sheep among which abortion had occurred the previous year. Blood samples were taken from the cows, two of which gave a positive reaction to the agglutination test. Samples of milk were taken from the reacting animals and inoculated into guinea pigs. These were killed on the 60th day and in one case pure cultures of *Br. melitensis* were recovered from the organs, agglutination tests being done. The author considers that, at any rate in some districts in Italy, *Br. melitensis* infection of cattle is far more common than is generally supposed.—J. A. Nicholson.

I. —. (1935). Aus der Durchführungsverordnung über die Bekämpfung des seuchenartigen Verwerfens der Rinder. [**Order on the Control of Bovine Contagious Abortion (Austria)**].—*Oest. Tierarzt.* **8.** 123-125.

II. —. (1935). Die Bekämpfung des seuchenartigen Verwerfens der Rinder. [**The Control of Bovine Contagious Abortion (Austria)**].—*Ibid.* 111-113.

I. This is a discussion of the above order which was due to come into force on June 1st, 1935. The various sections refer respectively to veterinary supervision and instruction, the testing of milk and blood of animals, and measures to be adopted on clean and infected premises. Attention is drawn to the lack of knowledge among many cattle owners concerning *Brucella abortus* infection; it is suggested that propaganda by means of leaflets and closer co-operation with veterinarians should be encouraged in order to rectify this. In the meantime, penalties should be lenient and imposed with discretion.

II. The same ground is covered in this paper as in the above, though more particular attention is given to the procedure to be adopted with regard to the reporting of the disease and various aspects of the problem such as segregation, regulation of pastures, maintenance of clean herds and vaccination, which are discussed under separate headings.—N. S. Barron.

Schoop, G. (1935). Bruzellosen beim Pferd. [**Brucella Infection in Horses**].—*Dtsch. tierärztl. Wschr.* **43.** 547-548. 1 table. [3 refs.]

The author examined 23 cases of fistulous withers and 12 cases of poll-evil and found approximately 50 per cent. of the former and 75 per cent. of the latter to be associated with the bovine strain of *Brucella abortus*. In cases of secondary infection due to *Streptococcus pyogenes* he failed to demonstrate *Br. abortus* microscopically or culturally, but guinea pig inoculation was positive in 21 per cent. of the cases of fistulous withers and in 27 per cent. of the cases of poll-evil. He regards as positive an agglutination reaction in a dilution of 1 : 200 and over. He records two cases in horses of a rheumatoid nature, which were associated with brucella infection.—G. Dods Munro.

Heathman, Lucy S. (1934). **A Survey of Workers in Packing Plants for Evidence of Brucella Infection.**—*J. infect. Dis.* **55.** 243-265. 11 tables, 10 charts. [29 refs.]

The author carried out serum agglutination and intradermal tests for the presence of brucella infection on 1,096 men employed in five meat-packing concerns.

The agglutination test showed 8·4 per cent. positive reactions (titres of 1 : 100 or over) and the intradermal test 54·7 per cent. Heathman suggests that the development of the allergic state is caused by long continued exposure to small doses of organisms of a low degree of virulence. From the evidence obtained from comparative control tests on presumably healthy persons, the intradermal test appeared to be of little diagnostic value.—T. M. Doyle.

Uranga, R. V., & Eguilaz, H. P. (1935). Contribución al estudio de la epidemiología y profilaxis de la fiebre de Malta en España. [**Contribution to the Study of the Epidemiology and Prophylaxis of Undulant Fever in Spain**]. —*Rev. Sanid. Hig. publ., Madr.* **10.** 337-385. 5 figs., 18 tables, 9 charts, 1 map.

An account is given of an epidemiological study between 1931 and 1934 of undulant fever in Logroño, a province in Spain, comprising about 100 villages with populations ranging from a few hundred to 12,000. A questionnaire was issued. Undulant fever is endemic in the province and, during the period of the survey, 532 cases were investigated. The majority of these cases were in persons between 20 and 50 years of age and 81 per cent. were in males. An analysis is made of the sources from which infection may have been derived, those considered being contact with human cases, goats, cattle and other farm animals and with excrements, and the consumption of milk and cheese. Only a small proportion of the cases could be related to one factor alone and, among these, were 17 in which there was no contact, the milk consumed having been boiled. One of the most striking points revealed by the analysis is the close correspondence, corroborated by statistical examination, of the incidence of undulant fever to the number of goats per 100 inhabitants. The authors place the sources of infection in the following order of importance :– contact with infected animals and handling of excreta from infected premises ; raw milk, and contact with cows. [The authors probably intend " infected animals " to be interpreted as goats]. The incidence of undulant fever is considerably higher in goat-herds than in shepherds. Some suspicion is attached to fleas, lice and flies in the transmission of infection to human beings.

32·4 per cent. of 1,610 samples of goat serum reacted to the agglutination test at a titre of 1 : 50 or over.

The remainder of the report is devoted to a discussion of legislation and methods of control.—R. S. Roberts.

Stone, R. V., & Bogen, E. (1935). **Studies of Correlated Human and Bovine Brucelliasis.**—*Amer. J. publ. Hlth.* **25.** 580-588. 4 tables, 1 chart. [20 refs.]

Agglutinins may appear in the blood serum of some human consumers of raw milk from cows infected with *Brucella abortus* and showing an agglutinating titre of 1 : 50 or over. This occurred in 8 per cent. of individuals who had regularly consumed heavily infected raw milk. Such incidence, however, varied with the duration of exposure to infection, the amount of raw milk consumed and the extent of infection in the bovine herd, but was not influenced by sex or by age. At the time the observations were made, more than half of the patients manifested the subclinical form of brucella infection and about one-eleventh had presented symptoms that warranted a diagnosis of undulant fever.—J. W. Emslie.

King, R. O. C. (1935). **Brucella abortus Infection in Man.**—*Aust. vet. J.* **11.** 92-97. [5 refs.]

The larger part of this paper is devoted to reviewing the literature on *Br. abortus* infection in man. Four cases in man have been encountered by the author and these are briefly described. King raises the question whether the infection may not spread from man to cattle and whether this may not be a factor to be reckoned with in eradicating the disease from the latter. The most satisfactory way of controlling the disease in man is to eradicate it from cattle.

—W. I. B. Beveridge.

Velu, H., & Zottner, G. (1935). Vaccination contre les brucelloses et excipient gras. [**Vaccination against Brucella Infection with Organisms Suspended in a Fatty Vehicle**].—*C. R. Soc. Biol. Paris.* **118.** 1157-1159. 1 table. [3 refs.]

The authors made comparative tests of agglutinin production in rabbits after the injection of living and of killed *Br. abortus* suspended in a fatty vehicle [see this *Bull.* **5.** 438.] and also in physiological saline. The sera were tested at one and two months. Suspensions of living and killed bacilli in the fatty vehicle caused more regular antibody production than those in saline.

Blood was taken from rabbits which had received living culture in saline or in a fatty vehicle and tested on guinea pigs. This was done every two days for 20 days after the inoculation of the rabbits. No agglutinin response was observed in the guinea pigs as a result, except in one case in which rabbit blood (infected with *Br. abortus* in saline) had been used, the titre being only 1 : 50.

The authors consider that the employment of a fatty vehicle results in the localization of the bacteria, but that their antigenic action is enhanced when given this way.—C. V. Watkins.

Velu, H., Weyland, H., Zottner, G., & Sarthou. (1935). Effets, chez le cheval, des injections de *Br. abortus* en excipient gras. [**The Effect on the Horse of the Injection of *Brucella abortus* in a Fatty Vehicle**].—*Bull. Acad. vét. Fr.* **8.** 254-256. [7 refs.]

The authors describe the various reactions (local, thermal, systemic and serological) which result from the subcutaneous injection into the horse of small doses of killed *Br. abortus* in a fatty vehicle, horses being found to be more sensitive to such an injection than other species of animals. Of ten horses tested two showed abscess formation, two showed slight initial signs of this and the remainder developed persistent and adherent fibrous swellings at the point of injection. The authors conclude from the local reactions that *Br. abortus* is probably pathogenic for the horse. [See also previous abst.]—C. V. Watkins.

Velu, H., Zottner, G., & Sarthou, C. (1935). Antigènes brucelliques gras et réactions allergiques. [**Fatty Brucella Antigens and Allergic Reactions**]. —*C. R. Soc. Biol. Paris.* **119.** 856-858. [2 refs.]

In contradiction to the assertion of Rossi and Vigel [this *Bull.* **4.** 527.] that the subcutaneous inoculation of dead *Br. abortus* does not lead to the development of capacity to give a positive intradermal reaction with a *Br. abortus* antigen, the authors found that after injecting cattle, sheep, horses and mules subcutaneously with killed *Br. abortus* in a fatty vehicle they reacted later to the intradermal test. Horses are particularly sensitive to the intradermal test and some which had not received *Br. abortus* gave a positive reaction. The intradermal test is, therefore, not free from error as indicating the presence of infection in horses.—C. V. W.

Meyer, K. F. (1934). **Identification and Differentiation of the *Brucella* Group.** —*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 3023-3031. [Numerous refs.]

Meyer gives a concise review of the various methods which have been put forward for the differentiation of the brucella, viz. morphology, tests for sensitiveness to CO_2, production of hydrogen sulphide, tolerance to thionin, fuchsin and pyronin, serological observations, pathogenicity, etc. In dye and pathogenicity tests, he emphasizes that inocula of definite size should be used. He stresses that, as pointed out by Wilson, the methods in use, particularly serological methods, are only of value for freshly isolated strains. It is suggested that identification of types should only be entrusted to specialists and that every culture be studied by at least two independent groups before definite conclusions are reached regarding the probable nature of the strain. Intermediates are believed to be common. All investigations should be in laboratories whose staffs are immune to brucella. —A. W. Stableforth.

Zuwerkalow, D., Fischbein, W., & Juranoff, A. (1935). Die Toxinbildung der Brucella abortus und das Phänomen Schwarzmanns. [**Toxin Production by *Br. abortus* and Shwartzman's Phenomenon**].—*Arch. wiss. prakt. Tierheilk.* **69.** 224-228. 1 fig. [4 refs.]

Reference to the literature with regard to work carried out in an attempt to demonstrate toxin production by *Br. abortus* or *Br. melitensis* reveals a lack of uniformity in the results.

An attempt was made by the authors to produce a toxin by growing four freshly isolated strains of *Br. abortus* on a variety of media, which are described. The possibility of using allantoic fluid was also investigated. With regard to the latter it was found that during the first half of pregnancy this is a transparent, colourless fluid which will not support growth but, after the sixth or seventh month, it becomes yellowish in colour, has a pH of 6·6 to 6·8 and *Br. abortus* will grow freely in it.

Cultures were all tested after 6, 8, 12, 21 and 45 days' incubation by injecting 1 to 2 c.c. of filtrate intraperitoneally into three white mice, but no evidence of toxin production was obtained.

Shwartzman [(1930). *Klin. Wschr.* **9.** 1925 and 1974.] noted that, if the filtrate of a culture were injected intradermally into the shaved skin of a rabbit, and followed 24 hours later by an intravenous injection of the same filtrate, a marked skin reaction developed at a variable period afterwards. The authors were successful in inducing this reaction in two out of four rabbits four to five hours after the intravenous injection of 8 to 10 c.c. of filtrate. The strains of *Br. abortus* used were freshly isolated and only cultivated for 48 hours. It is probable that recorded failures to establish this phenomenon [Kritschewsky & Galperin (1934). *Z. Mikrobiol.* **12.** 2.] were due to the fact that the strains used were too old and were incubated for too long.

In view of the fact that the reaction is not only a local one, the general health of the rabbit being affected and lesions present in the internal organs, it is probable that a true toxin is not present. It is suggested that the changes which occur are analogous to those which are to be found in the uterus in naturally occurring cases in bovines.—N. S. Barron.

I. van Goidsenhoven, C., & Bertrand, G. (1935). Sur la différentiation du bacille de Chauveau et du vibrion septique de Pasteur. [**Differentiation of *Clostridium chauvoei* and *Cl. septique***].—*Ann. Inst. Pasteur.* **55.** 74-102. 23 figs. [35 refs.]

II. van Goidsenhoven, C., & Bertrand, G. (1935). Sur la différentiation du bacille de Chauveau et du vibrion septique de Pasteur. (Communication préliminaire). [**Differentiation of *Cl. chauvoei* and *Cl. septique***].—*Ann. Méd. vét.* **80.** 97-109.

I. The authors review the common methods which have been adopted for the cultivation of anaerobes. The method which they used in this work was that of Fortner, which consists of growing the suspected material on blood agar in a petri dish in the presence of *Chromobact. prodigiosum*, the petri dish being not more than 1 cm. in depth. The blood agar plate is poured and dried, and half of its surface is sown with *Chr. prodigiosum* and the other half with the material for examination. The part of the petri dish containing the culture is then covered with a glass plate, sealed with plasticine and incubated. Excellent results are obtained by this method.

The authors used one strain of *Cl. septique* and one of *Cl. chauvoei*, and the organisms obtained by Fortner's technique from 18 samples of infected muscle [source not given]. The muscle was triturated in a few drops of saline and sown on to half of the plate. The tendency for *Cl. chauvoei* to remain discrete and for *Cl. septique* to spread and fuse is discussed. Four parts per 1,000 of sodium phenylethylmalonylurate (luminal) mixed with the medium was found to inhibit the excessive spread of *Cl. septique* and, although the resultant colonies still showed the typical processes, they did not cover up the colonies of other organisms which might be present in the seed material.

The differential characters of the two organisms when grown in glucose agar, in liver broth, in milk meat medium and in sugars, and when inoculated into guinea pigs are described.

The authors found that liver-broth cultures of *Cl. chauvoei*, if under eight days old, haemolysed washed sheep red blood corpuscles, whereas similar cultures of *Cl. septique* did not, if over 24 hours old.

From the 18 samples of muscle, *Cl. septique* and *Cl. chauvoei* were obtained in equal numbers (none of the samples showed mixed infection or infection with other anaerobes).

II. An abbreviated version of I.—A. Brownlee.

Debelić, S. (1935). Šustavac (Gangraena emphysematosa) u Jugoslaviji. [**Blackleg in Yugoslavia**].—*Vet. Arhiv.* **5.** 351-355. 2 tables, 1 chart. [Abst. from German summary].

Official reports show that, during the five years 1924 to 1928, outbreaks of blackleg occurred continuously in 25 departments while the other eight departments were quite free.

I. Huber, F. L., & Kraneveld, F. C. (1935). Anaërobe bacillen en de door hen veroorzaakte infecties bij de huisdieren in Nederlandsch-Indië. XV. Het formolvaccin bij de boutvuurbestrijding. [**Anaerobic Infections of**

Domestic Animals in the Dutch East Indies. XV. Formol Vaccine against Blackleg].—*Ned.-ind. Bl. Diergeneesk.* **47.** 61-94. 11 tables. [44 refs.] [English and German summaries : abst. from orig.]

II. Kraneveld, F. C., & Djaenoedin, R. (1935). Anaërobe bacillen en de door hen veroorzaakte infecties bij de huisdieren in Nederlandsch-Indië. XVI. Over opzending van ziektemateriaal ter onderzoek op anaërobe bacillen en enkele voor Nederlandsch-Indië bijzondere gevallen van gasoedeem. [**Anaerobic Infections of Domestic Animals in the Dutch East Indies. XVI. The Despatch of Material for Diagnosis**].—*Ibid.* 150-160. 1 fig., 1 table. [English and German summaries : abst. from orig.] [For absts. of previous articles in this series, see this *Bull.* **5.** 120 and 546].

I. After an extensive review of the literature on formolized vaccine against blackleg, the authors give a detailed account of their comparative tests with formolized culture and carbol-filtrate on guinea pigs, sheep and cattle. Both conferred a strong active immunity very quickly so that cattle could resist 3 M.L.D. of live spores seven days after immunization.

Guinea pigs and sheep are unsuitable test animals for a vaccine for use on cattle, as guinea pigs are relatively very slow in acquiring immunity and sheep acquire immunity more rapidly than cattle.

Formolized culture is much easier to prepare than carbolized culture filtrate and is therefore preferred.

II. A general discussion on anaerobic infection and its peculiarities in the Dutch East Indies. *Clostridium welchii* and *Cl. septique* occur everywhere including the digestive tract of healthy animals, and blackleg breaks out periodically. Diagnosis is often difficult and the authors here give advice on the procuring of diseased tissue to send for bacteriological diagnosis and give three case records in illustration. These concern a goat and a cow which died of gas oedema caused by *Cl. welchii* and a bull which became very ill with gas oedema in the throat region, secondary lesions developing later on the neck and body : the bull recovered after 16 days' illness. The lesions were tapped and *Cl. welchii* and a large staphylococcus were isolated. Although the latter alone was not pathogenic, it appeared to enhance the virulence of the *Cl. welchii* strain when mixed and injected with it into guinea pigs.—J. E.

Weinberg, M., & Guelin, A. (1935). Culture de microbes anaérobies dans les milieux non régénérés additionnés d'extrait ou de cellules embryonnaires. [**The Cultivation of Anaerobic Bacteria in Embryonic Tissue Culture**].—*C. R. Soc. Biol. Paris.* **119.** 1364-1366.

An extract of embryonic tissue or a suspension of embryonic cells, when added to ordinary media in suitable conditions, allowed anaerobic bacteria to grow more rapidly and more abundantly. The addition of 1 c.c. of a suspension of embryonic cells to even unboiled old media tubes rendered them suitable for the growth of many of the anaerobes. Anaerobes grown in such media lose much of their pathogenic and toxicogenic properties, but recover these again on being sub-cultivated in ordinary media.—A. Brownlee.

Albiston, H. E., & Gorrie, C. J. R. (1935). **A Preliminary Note on Bovine Nasal Granuloma in Victoria.**—*Aust. vet. J.* **11.** 72-76. 3 figs. [6 refs.]

The authors have encountered a number of cases of nasal granuloma in bovines. The symptoms are nasal discharge and respiratory embarrassment which, however, do not always lead to death, as the lesions apparently may retrogress. The lesions generally involve the anterior third of the nasal passages and consist of granulomatous nodules. Microscopically, the lesions are seen to be comprised

principally of hypertrophied connective tissue, and there is intense infiltration with eosinophiles and sometimes with giant cells. Smears and tissue sections frequently reveal yeast-like bodies in the depths of the lesions, sometimes enclosed in giant cells. A fungus resembling the yeast-like bodies found in lesions has been isolated and its cultural characters are described. It appears to be a blastomycete and grows readily on a variety of media under aerobic conditions, the optimum temperature being 37°C.

Further work is proceeding, but it is tentatively concluded that nasal granuloma in Victoria is due to infection with a fungus. Should this be confirmed, the name nasal blastomycosis is proposed, to differentiate it from other types of nasal granuloma described in India.—W. I. B. Beveridge.

Janiak, M. (1934). Badanie tresci woreczków zólciowych bydla na zawartość drobnoustrojów. [**Bacterial Content of the Gall-Bladder of Cattle**].—*Przegl. wet.* **47.** 195-214. 10 tables, 3 charts. [16 refs.] [German summary: abst. from orig.]

Bacteriological examination of 1,000 gall-bladders revealed that, in 83·5 per cent. of cases, the bile was infected with several species of intestinal bacteria, but chiefly with *Bact. coli*, putrefaction bacteria, a few cocci and with organisms of the paratyphoid group. *Salmonella paratyphi* B was found in 0·2 per cent. and *S. enteritidis* (Gärtner) in 0·3 per cent. of cases. The species and the number of infective bacteria appear to have some connexion with the food supply, with exhaustion shortly before slaughter and also with the atmospheric temperature.

When paratyphoid bacteria are present in the gall-bladders of slaughtered animals, the meat may easily become contaminated, especially in the case of cattle affected with flukes, with the result that there is usually injury to the mucous membrane of their gall-bladders. The gall-bladders, therefore, should be carefully removed from the livers of slaughtered animals.—K. Szczudlowski (Lwów).

Winslow, C. E. A. (1935). **What do we mean by a Bacterial Life Cycle ?**—*Science.* **81.** 314-315. [9 refs.]

The author discusses the evidence on life-cycles of bacteria. He is of the opinion that " if a unicellular organism shows a definite series of morphological and physiological alterations in response to certain changes in environment which are likely to occur with reasonable frequency in its natural life we may call it a ' life cycle ' if we wish or we may call it something else. In any case, this is the only kind of life cycle (other than binary fusion) which can occur in unicellular . . . . forms ".—J. E.

DISEASES CAUSED BY PROTOZOAN PARASITES.

Spector, Bertha K. (1935). **The Pathological Changes Produced in the Intestines of Kittens by *Endamoeba histolytica* with and without Certain Added Bacteria.** —*Amer. J. Hyg.* **22.** 366-375. [20 refs.]

This article records experiments carried out on kittens to ascertain the influence of certain associated bacteria on the pathogenicity of *E. histolytica.* Cultures of the amoebae, or freshly isolated organisms, were inoculated *per rectum* with various species of bacteria, control kittens being inoculated with amoebae alone or the bacteria alone. The results were judged by the severity of the intestinal ulceration. The incidence of infection and the severity of the ulceration were increased to the greatest extent when the amoebae were associated with freshly isolated strains of haemolytic streptococci, green-producing streptococci, pneumococci Types I and III, *Bact. coli* and *Pseudomonas pyocyanea.* With prolonged

cultivation of amoebae and haemolytic streptococci there was a great decrease in the mortality and in the degree of ulceration. Haemolytic streptococci and *Salmonella paratyphi* B were frequently encountered, during winter months, in the heart-blood of kittens which had not been inoculated with these organisms. —U. F. RICHARDSON.

TOPACIO, T. (1935). **Single Cell Transmission of Surra.**—*Philipp. J. anim. Indust.* **3.** 213-224. 4 tables. [21 refs.]

Single trypanosomes were isolated in droplets of blood suspensions on sterile cellophane paper and inoculated into rats, mice, guinea pigs, dogs and one horse. Infection resulted in all the species of animal under experiment, but guinea pigs appeared to exhibit a natural resistance, as only six out of 16 animals inoculated became infected. In a rat inoculated subcutaneously with one trypanosome, the incubation period averaged ten days, whilst when inoculated intraperitoneally it averaged 8·6 days. Only small numbers of the other species of animal were under experiment. The author considers that the ability of a single specimen of *Tryp. evansi* to infect a mammalian host favours the supposition that the normal method of transmission is mechanical, and discounts the belief that any cyclical development occurs in the normal vector.—U. F. RICHARDSON.

VELU, H., & ZOTTNER, G. (1935). La prophylaxie de la dourine par chimio-prévention et chimiothérapie sous contrôle sérologique. [**The Prevention of Dourine by Therapeutic Methods Controlled by Serological Tests**].—*Arch. Inst. Pasteur Algér.* **13.** 339-368. 1 table, 8 graphs. [17 refs.]

The authors, continuing their work on the control of dourine in Algeria, emphasize the value of the complement-fixation test both in diagnosis and as a check on the efficacy of treatment.

The stable alcoholic antigen [this *Bull.* **4.** 621.] has given the same results as Watson's antigen, and can be stored. Treatment with novarsenobenzol is said to give satisfactory results if given in large doses (30 g. for the horse), but relapses sometimes occur, and treatment should not be considered as effective until the serum becomes negative to the complement-fixation test.

Further experiments are recorded on the value of preventive inoculation with " naganol ", and a dose of 0·0035 g. per kg. body weight, injected subcutaneously every ten days, is recommended on the results of a small number of experiments in which animals treated in this way resisted infection by the application of the blood of infected guinea pigs to the nasal mucous membrane, though controls developed dourine [see also this *Bull.* **4.** 720].

Infected animals treated in the same way with small doses of " naganol " made an apparent recovery but failed to become negative to the complement-fixation test and finally relapsed.—U. F. RICHARDSON.

WYSSMANN, E. (1935). Zur Frage der durch Trypanosoma Theileri bedingten Erkrankungen beim Rind. [*Tryp. theileri* **Infection in Cattle**].—*Schweiz. Arch. Tierheilk.* **77.** 401-415. 1 text fig., 2 figs. on 1 plate. [Numerous refs.]

The author records observations on two cows which became ill and died and were found to be infected with *T. theileri*. The first animal died within a few hours after the appearance of symptoms, and anthrax was suspected. The second animal lived three days, and exhibited fever, a rapid pulse, dyspnoea, petechiae on the visible mucous membranes, discharge from the nose and vagina and haemorrhagic sweat. On *post-mortem* examination, the lesions in both animals were very similar, consisting of an acute haemorrhagic gastro-enteritis, enlargement of the liver and spleen, haemorrhagic inflammation of the lymphatic glands and petechial haemorrhages under the serous membranes, mucous membranes and skin.

The first animal showed a swarming infection of the peripheral blood with trypanosomes, whilst in the second animal the parasites could be detected in stained smears but not in fresh blood films. Attention is drawn to the similarity of the disease in these two animals to previous accounts of disease in cattle associated with infection with *T. theileri*, and although it is admitted that no proof of the pathogenicity of this species exists, yet it is considered that it should not be regarded as harmless. It is argued that in certain circumstances, certain strains may develop virulence and that some cases diagnosed as purpura haemorrhagica may in fact be due to infection with this trypanosome.—U. F. Richardson.

Clark, H. C., & Benavides, J. (1935). **The Cattle Reservoir for Equine Trypanosomiasis in Panama.**—*Amer. J. trop. Med.* **15.** 285-299. 12 tables. [2 refs.]

In order to ascertain the position as regards bovine infection with *Tryp. hippicum* in Panama, the authors undertook an investigation into the incidence of infection in cattle from the provinces brought to Panama City for slaughter. By subinoculation of guinea pigs, infection was proved in 2·1 per cent. of the animals, although it was not revealed from the examination of thick blood smears taken at the time of subinoculation. Strains of trypanosomes collected from the abattoir were inoculated into six calves in order to ascertain how long infection would persist. Trypanosomes could be detected in thick smears up to 18 days from the time of inoculation ; guinea pig inoculation revealed persistence up to six months, and the complement-fixation test remained positive up to the limit of observation which, in one case, was nine months. Out of three vampire bats [*Desmodus* sp.] fed on the inoculated calves, only one became infected, but this animal transmitted the infection to a guinea pig. All the strains of trypanosomes collected proved virulent to horses, though the infected calves developed normally, and fattened better than similar animals which remained on the ranges.—U. F. Richardson.

Maclean, G. (1935). Die Bekämpfung der Rhodesiense-Form der Schlafkrankheit in Tanganyika. [**The Control of** *Tryp. rhodesiense* **Sleeping Sickness in Tanganyika**].—*Arch. Schiffs- u. Tropenhyg.* **39.** 381-389. 1 fig., 1 table.

This article discusses the possible origin of the outbreaks of sleeping sickness due to *T. rhodesiense* infection which have occurred in Tanganyika, and explains the modifications effected by civilization in the native methods of life which have favoured the contact between human beings and tsetse fly, and thus favoured the spread of the disease. The methods of control in operation are based upon attempts to attack the trypanosome in the human carrier, and to prevent further infection by breaking the contact between man and fly. Both these lines of action require the concentration of the human population to facilitate inspection and treatment, and to allow of the formation of cleared settlements which shall be relatively fly-free. Such settlements have been comparatively successful, and in one of them the case incidence dropped from 28 per 1,000 in 1925 to 6·67 per 1,000 in 1927. The chief obstacles to complete success are the relapse of treated cases and the continued infection of hunters and fishermen who come in contact with flies in which infection may be maintained from game. It is considered that the increase of thicket in coast areas will not create a danger of sleeping sickness, as such thickets are unsuitable for *Glossina morsitans* but favour *G. pallidipes* and *G. brevipalpis* which carry trypanosomes pathogenic for stock.—U. F. Richardson.

Happold, F. C., & Stephenson, Dora. (1935). **The Toxicity of Bactericidal Substances for Flagellate Parasites, with Special Reference to their Application in the Isolation of Leptomonas Forms.**—*Parasitology.* **27.** 383-393. 7 tables. [5 refs.]

Following up the successful isolation of flagellates from the alimentary tract of diptera by exposing them to 1 : 10,000 to 1 : 100,000 quinanil for two to four hours and then inoculating into Locke serum agar containing quinanil in concentrations of 1 : 10,000 to 1 : 50,000, the authors carried out experiments with various bactericidal substances to ascertain their relative lethal powers on bacteria and flagellates. Various forms of leptomonads and leishmanial parasites were employed as representatives of flagellates and *Staphylococcus aureus*, *Bact. coli* and *Chromobact. prodigiosum* as bacterial contaminants.

The results obtained with gentian violet, brilliant green and two out of five anilquinolines were not encouraging, but the other three anilquinolines, quinanil, 52 and 113, gave promising results, and success in purifying laboratory-contaminated cultures was obtained by using quinanil. The results indicated that there is little hope of isolating pure cultures of *Leishmania* by this method, as all the leishmanial forms proved extremely susceptible to the toxic effects of all the substances employed. It is noted that a strain of *L. tropica* behaved like a *Leptomonas* form.—U. F. Richardson.

Donatien, A., & Lestoquard, F. (1935). Observations et réflexions sur la leishmaniose générale du chien. [**Observations and Reflections on Canine Leishmaniasis**].—*Arch. Inst. Pasteur Algér.* **13.** 320-338. [6 refs.]

From observations on 21 dogs infected with leishmaniasis, kept under examination for seven months, the authors conclude that there is no relationship between the clinical symptoms exhibited and the intensity of the parasitic infection. It appears that in some cases the disease may remain quiescent without the production of visible symptoms for periods as long as four months. This quiescent period may terminate by the appearance of mild clinical symptoms, such as emaciation, or by severe acute symptoms which may even lead to death.

An examination of the skin of the animals under observation showed that the parasites could always be detected in any area of the skin of an infected dog. The authors conclude from this that canine leishmaniasis is a disease of the whole reticulo-endothelial system, and that such a description as " canine visceral leishmaniasis " is misleading. They also point out that the examination of skin smears is valuable for diagnostic purposes, particularly in examining large numbers of dogs in an attempt to ascertain the prevalence of infection, and also that skin examination allows of the detection of cases in the early stages of the disease. The formol-gel test and the flocculation of serum in distilled water gave positive readings with the sera of all known infected animals. Greater importance should be attached to opalescence in the formol-gel test than to gelification.—U. F. R.

Hassan, S. R. (1935). **Globidiosis of Indian Cattle, with a Description of a New Species.**—*Indian J. vet. Sci.* **5.** 177-183. 3 figs. on 3 plates. [9 refs.]

This article records the infection of five cattle in India with a species of *Globidium*. The infection was associated with intermittent dysentery, and the author considers that it might play an important part as a cause of debility in cattle, and be stimulated to marked aggressiveness by other diseases, such as rinderpest. A good description of the organism is given, and it is pointed out that it differed from *G. gilruthi* in that the tapering spores were somewhat larger and not twisted or truncated, whilst the cysts were encountered in the ileum and in the neighbourhood of the ileocaecal valve and were not confined to the abomasum. On these grounds the author is of the opinion that the organism should be considered as a new species, and proposes the name *G. fusiformis*. The spores could be recovered from the faeces by the sugar flotation method and, with Giemsa's stain, showed a vesicular nucleus towards the tapering end and a large chromatin granule in the centre of the body.—U. F. Richardson.

Nieschulz, O. (1935). Ueber Kokzidien der Haustauben. [**Coccidiosis in Pigeons**].—*Zlb. Bakt. I.* (*Orig.*). **134.** 390-393. 2 figs. [7 refs.]

The author records two types of coccidia of pigeons. Four birds appeared to have a pure infection of *Eimeria labbeana* [better known as *E. pfeifferi*], the smaller of the two types with oocysts averaging $16{\cdot}7 \times 15{\cdot}3\mu$, whilst in three birds a larger type, with oocysts averaging $20 \times 18{\cdot}7\mu$, was found in a state of purity. For this parasite the name *E. columbarum* is suggested. The author failed to infect fowls with either type of the coccidia of pigeons.—U. F. Richardson.

Manwell, R. D. (1935). **How many Species of Avian Malaria Parasites are there?**—*Amer. J. trop. Med.* **15.** 265-282. 49 figs., 2 plates. [Numerous refs.]

The author discusses the validity of the described species of avian malaria. In addition to *Plasmodium praecox*, *P. cathemerium*, *P. elongatum*, *P. rouxi* and *P. circumflexum*, he accepts *P. vaughani*, a parasite of birds of the robin family, *P. polare*, a plasmodium of the cliff sparrow, and *P. nucleophilum* of the cat bird as probable distinct species, and perhaps also *P. capistrani* from the Philippine quail. Other species are rejected mainly on the grounds that the descriptions of them have not been sufficiently complete. He also points out that plasmodia have been recorded in the Sumatran fowl, the Japanese turtle dove, the night owl and the purple grackle, and that probably several other species exist. He suggests that perhaps all these organisms should be regarded as races within a species but, since morphological differences are great enough to allow of their differentiation, he prefers to regard them as distinct species. He uses the name *P. praecox* in preference to the more correct form *P. relictum*, on the grounds that the former is in more general use.—U. F. Richardson.

Marotel. (1935). Nomenclature et classification des piroplasmes. [**Nomenclature and Classification of the Piroplasms**].—*Rev. vét., Toulouse.* **87.** 537-540. 1 table.

The author discusses the use of the words piroplasm, piroplasmosis, haemosporidiosis and other terms used to describe various blood infections by intracellular organisms. He puts forward a system of classification in which the genus *Babesia* is divided into the two genera *Piroplasma* and *Babesiella* owing to the different reaction of the individual species to treatment with trypan blue and " icthargan ", and the genus *Nuttallia* is retained owing to its tendency to produce multiplication groups of four individuals. The genera *Leucocytozoon*, *Anaplasma* and *Leishmania* are included with the *Babesia* and *Theileria* in one family, the Piroplasmidae, as they are all intracellular organisms. [The leucocytozoa belong to the class of protozoa known as sporozoa, babesia are also usually included in that class, though this has recently been disputed. Little is known as to the nature of anaplasma, whilst leishmania are certainly not sporozoa. The inclusion of these various forms in one family is inadmissible].—U. F. Richardson.

I. Legg, J. (1935). **Recent Research into the " Redwater " Diseases of Queensland Cattle.**—*J. Coun. sci. industr. Res. Aust.* **8.** 79-85. [2 refs.]

II. Legg, J. (1935). **Recent Research into the " Redwater " Diseases of Queensland Cattle.**—*Aust. vet. J.* **11.** 78-79.

I. This is a continuation and to some extent a recapitulation of work previously recorded on " tick fever " of cattle in Queensland [this *Bull.* **4.** 221 and 505]. The author studied the disease in natural outbreaks and, by splenectomizing tick-infested animals, found the following piroplasms :– *Babesia argentina*, *Anaplasma marginale*, *B. bigemina* and the benign *Theileria mutans*. The disease

produced by each of these is described. *B. argentina* seems to be the most widespread, and this infection is not easily controlled by dye therapy, though " trypaflavine " has given some encouraging results. However, it was found that cattle premunized with *B. bigemina*, which is susceptible to drug treatment, offer considerable resistance also to *B. argentina*. *A. centrale* has been imported from Africa, and its power to confer resistance against the Australian strain of *A. marginale* is being tested. It is hoped that a practical solution to the problem will be obtained by vaccination with blood from animals infected with *B. bigemina* and *A. centrale*.

II. This is a long abstract of I.—W. I. B. Beveridge.

Sarwar, S. M. (1935). **A Hitherto Undescribed Piroplasm of Goats** (*Piroplasma taylori*).—*Indian J. vet. Sci.* **5.** 171-176. 7 figs. on 4 plates, 1 table. [12 refs.]

The author describes a piroplasm from blood smears taken from a goat which died after two or three days' illness, exhibiting congestion of the visible mucous membranes, enlargement and congestion of the liver, enlargement of the spleen, congestion of the cortical area of the kidney and petechiae on the epicardium, endocardium and trachea. The urine was clear and straw coloured. The organism, as seen in the blood smears, resembled *Babesia ovis* except that as many as 16 individuals were encountered in a single red blood corpuscle, and it appeared that multiple division into 2, 4, 8 and 16 individuals might occur. 11 per cent. of the corpuscles were infected, a higher percentage than that recorded for any other piroplasm infection of sheep or goats. The author proposes to create a new genus, *Piroplasma*, and suggests the name *P. taylori*. [The high percentage of infected corpuscles, and the large number of organisms encountered in single corpuscles, may purely represent unrestricted multiplication due to exceptional virulence of the organism or exceptional susceptibility of the individual host].—U. F. R.

Boynton, W. H. (1934). **Anaplasmosis in Cattle.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 3047-3053. [31 refs.]

This article reviews the literature of anaplasmosis, giving special consideration to the recent work which has been carried out in the United States of America. Experiments in America have failed to confirm the passage of anaplasms from the mother to its offspring either *in utero* or through the milk. Four species of tabanids have been proved to be capable of transmitting the disease, and it appears to be readily transmitted mechanically by operating instruments. In one experiment it was found that a carrier animal became free from infection after four years. The incubation period has been found to vary with the infecting dose. With large doses of blood inoculated subcutaneously the period varies from 17 to 20 days ; when transmitted by ticks or by infected instruments it is approximately 45 days, and in one case of fly transmission it reached 107 days. In addition to the ordinary acute and chronic types of the disease, a peracute type, which may be mistaken for anthrax, has been encountered in dairy cows. The complement-fixation test has not proved reliable in the diagnosis of carrier animals, and a cheap and reliable method of detecting such animals is required before control measures can be entirely satisfactory. The author considers that, although some drugs may be beneficial in the treatment of the disease, they do not act by destruction of the parasite, and both a method of destroying the parasite, and a method of immunization which does not produce carriers, are required.—U. F. Richardson.

McNaught, J. B., Woods, F. M., & Scott, V. (1935). **Bartonella Bodies in the Blood of a Non-Splenectomized Dog.**—*J. exp. Med.* **62.** 353-358. [11 refs.]

In the course of experiments on dogs (fed on a basal diet adequate in vitamins) in which the plasma proteins were lowered by repeated daily bleeding followed by injection of washed red corpuscles from healthy donors, an uncontrollable anaemia developed in one of the animals. Bodies were found in and on the erythrocytes indistinguishable from the descriptions given of *Bartonella canis*. Spontaneous appearance of these bodies and their experimental transmission to healthy dogs has formerly been recorded only in splenectomized animals.

The infection was successfully transmitted to a healthy dog by an intravenous injection of whole blood and this animal and the original one were both cured of the infection by a single injection of neo-arsphenamine (15 mg. per kg. body weight).

It is suggested that the continued bleeding and consequent lowering of plasma protein may have caused diminution in the amount of a protective substance which the spleen normally liberates into the blood stream and which is lacking in splenectomized dogs.—E. G. White.

Donatien, A., & Lestoquard, F. (1935). Existence en Algérie d'une *Rickettsia* du chien. [**Rickettsia Isolated from Dogs in Algeria**].—*Bull. Soc. Path. exot.* **28.** 418-419. [1 ref.]

Observations at the Institute Pasteur in Algeria, on dogs exposed to natural infestation with *Rhipicephalus sanguineus*, which was both rapid and intense, led to the discovery of rickettsia not previously recorded. The rickettsia were first noted *post mortem* in a drop of blood from the axillary artery.

Two dogs which had been exposed to *R. sanguineus* developed anaemia and fever and died, one in seven and the other in 15 days. In both cases rickettsia were demonstrated before death in the peripheral blood, and also *post mortem*.

Another dog carrying only three or four ticks died suddenly and rickettsia were demonstrated *post mortem*. Infection by rickettsia was also demonstrated in several other dogs which were heavily infested with ticks of the same species.

Giemsa's stain most often revealed a collection of red coccus-like granules. The group of granules sometimes contained four to six bodies and was then 2 to 3μ in size. Some of the groups were 10μ in size. They then contained several dozen granular forms. Rarely, the bodies were coccobacillary in form.

At the beginning of infections few rickettsia were found on a film while, *post mortem*, up to 30 could be found on a preparation.

Experiments are being carried out to determine if this organism can produce disease in man. In the monkey (*Macacus inuus*) a febrile reaction is produced and the organism is demonstrable in the peripheral blood.

For the present, the name *Rickettsia canis* is suggested.—F. H. Manley.

Klarenbeek, A. (1935). Leptospirosis-Ictero Haemorrhagiae (Weilsche Krankheit) beim Hunde. [**Leptospiral Jaundice in Dogs**].—*12th Int. vet. Congr. 1934.* **3.** 349-357. 1 fig. [English, French and Spanish summaries : abst. from orig. in German].

In view of the importance of Weil's disease amongst human beings in Holland, the relationship of canine leptospirosis to the human leptospiral infection and the nature of the disease in the dog are matters of considerable interest. The author asks whether cross-infection between man and dog can occur. The symptomatology and diagnosis of the disease are discussed. Diagnosis depends upon the demonstration of the leptospira by direct or indirect means, *viz.* the examination of blood or urine under dark field illumination ; the measurement of the lytic power of the blood for leptospira, guinea pig inoculation leptospira being subsequently identified in the blood of the inoculated animal, or by culture of the organism in special media.—E. J. Pullinger.

DISEASES CAUSED BY VIRUSES.

TURNER, A. W., CAMPBELL, A. D., & DICK, A. T. (1935). **Recent Work on Pleuro-Pneumonia Contagiosa Boum in North Queensland.**—*Aust. vet. J.* **11.** 63-71. 1 table.

This article comprises a short general account of important contributions to our knowledge of certain aspects of contagious bovine pleuro-pneumonia and should be read in the original by veterinarians interested in this disease.

An intensive study of the causal organism has been greatly aided by the elaboration of a new medium consisting of a peptic digestion of ox heart and liver with serum added, the whole being sterilized by filtration. In this medium – " B.V.F.-O.S." – the organism grew luxuriantly and retained viability and virulence for long periods, so that cultures in it could with advantage replace " natural virus " for immunization purposes. The authors discountenance the prevailing habit of classifying the organism as a true filtrable virus. It commonly grew as a relatively large branching mycelium which produced filtrable, spore-like bodies referred to as conidioids. It was able to reproduce by at least five distinct methods. As there is no provision for such an organism in the present scheme of bacterial classification, the authors proposed for it a new order, " Borrelomycetales ", and the name *Borrelomyces peripneumoniae*. Contrary to earlier belief, the organism could be easily stained in sections, provided that some fixative other than formalin was used. In acute cases of pleuro-pneumonia, the organism could be recovered from the blood and from most internal organs. A peculiar and hitherto undescribed lesion, which was occasionally seen in young cattle, was a gelatinous infiltration of the epidural space in the sacral region, sometimes extending along the sciatic nerves, associated with partial paraplegia.

Extensive work was carried out on the complement-fixation test and in all cases the diagnosis, whether positive or negative, was in agreement with *post-mortem* findings.

Animals vaccinated in the usual way showed a transient positive reaction which disappeared in six weeks. It was found that cattle immunized by the usual method might occasionally contract the disease in a mild form and develop into carriers.—W. I. B. BEVERIDGE.

WEBB, H. M. (1935). **Contagious Pleuro-Pneumonia of Cattle.**—*Vet. J.* **91.** 446-449.

This article describes the method of combating contagious bovine pleuro-pneumonia in the Bechuanaland Protectorate. Great difficulty was encountered in the northern area of the protectorate owing to the absence of roads and the delay in reporting disease in the cattle, which were scattered over a vast area of sparsely populated country under the charge of irresponsible native herdsmen. The disease was dealt with by the slaughter of all affected animals in a herd and the inoculation of healthy in-contacts with glycerinized virus from the pleural cavity. It is stressed that only clear amber-coloured pleural exudate should be used. 0·25 c.c. of virus was inoculated into the tip of the tail, and upward extension of the swelling checked by ring firing round the tail. Any wounds which occurred were protected from maggot infestation by the application of petrol followed by dressing with Stockholm tar. In case of a shortage of pleural virus, calves were inoculated in the dewlap, and virus collected from the resulting swellings. The inoculations were repeated in a month to insure that there were no failures to react.
—U. F. RICHARDSON.

HENRY, M. (1934). **Pleuro-Pneumonia Contagiosa of Bovines.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 3033-3046. [Numerous refs.]

Commencing with the earliest records of the disease as an epizootic in Central Europe in the beginning of the 18th century, the author traces the almost world-wide spread of infection which reached England in 1841, South Africa in 1854 and Australia in 1858. In Australia its progress was devastating and in four years it had crossed the continent from Victoria to Queensland. New Zealand and Tasmania have always been free from the disease. Coincident with the progress of infection, the disease was successfully attacked and many countries, by means of a slaughter policy, succeeded in freeing themselves, showing that eradication was practicable. The success of this policy rests on the control of cattle movements.

The author then discusses the situation in New South Wales and points out the difficulty of putting into force any control measures in a state where cattle may only be seen once a year. When an outbreak is confirmed all clinically affected animals are destroyed, in-contacts are vaccinated and the premises quarantined. Vaccination is effected by setons soaked in virulent pleural exudate inserted in the tail one or two inches from the tip. Although other methods have been tried the above yields the best results. The mortality following vaccination, and due to it, is sufficiently high to militate against vaccination as a prophylactic measure.

In addition, every effort is made to supervise the entrance of cattle into the state from Queensland and the Northern Territory, whence infection is being continually reintroduced.

The author concludes by saying that " up to a point it [the method of control] works satisfactorily but it does not eliminate the ' carrier '. Now if to that method of control could be added the use of a reliable and easily-applied biological test, enormous progress would result."—GWILYM O. DAVIES.

CASSAMAGNAGHI, A. (1931). La fiebre aftosa. Revista critica y experiencias propias. **[Foot and Mouth Disease. A Critical Review and a Record of Experiments].**—*An. Esc. Vet. Uruguay.* **2.** 3-26.

The greater part of this article is a survey and discussion of methods of control which may be applicable to conditions in Uruguay. In that country a system of control similar to those in force in Great Britain and the United States of America cannot be contemplated, but the author believes that with a personnel of 28 it would be possible to deal with outbreaks by isolation of the centre of infection, serum treatment of valuable animals, serum-virus immunization of animals essential for breeding and virus treatment for general stock.

The author collected 26 strains of virus from natural outbreaks. Eighteen of these were subjected to cross-immunity tests and plurality of viruses was demonstrated. Fifteen strains were assigned to one group and three to another. [No details of comparison with known groups].—R. S. ROBERTS.

MENCH, K. (1935). Lymphadenose bei einem Pferde. (Eine Beitrag zur Differentialdiagnose bei ansteckender Blutarmut). **[The Differential Diagnosis of Lymphadenosis and Infectious Anaemia In Horses].**—*Berl. tierärztl. Wschr.* **51.** 467-468.

The writer emphasizes the difficulty in differentiating between these two conditions in certain cases. One instance is described when infectious anaemia was diagnosed as a result of clinical evidence and blood examinations. Macroscopic and microscopic *post-mortem* findings, however, showed the condition to be lymphadenosis.—E. J. PULLINGER.

MEYER, K. F. (1934). **Neurotropic Virus Infections of the Horse.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 2915-2925. 1 table. [18 refs.]

This is a review of Borna disease, " Moussu and Marchand disease " and the American equine encephalomyelitis, which does not lend itself to abstraction. The condition referred to by the author as " Moussu and Marchand disease " is enzootic equine encephalitis as seen in France and first announced by those authors in 1922, who then concluded from their studies that it was identical with Borna disease. Other investigators do not share this view, and ZWICK is stated to have concluded that " epizootic encephalitis (MOUSSU and MARCHAND) is an acute, severe, infectious disease of septicaemic character with predominant involvement of the central nervous system, while Borna disease is an elective neurotropic infection of the brain and cord without any particular participation of the body as a whole ".—GWILYM O. DAVIES.

ROSENBUSCH, F. (1934). La encefalomielitis de los yeguarizos en la Argentina es una enfermedad infecciosa. [**Encephalomyelitis, an Infectious Disease of Horses in Argentina**].—*An. Soc. rur. argent.* **68.** 19-22. 4 figs.

The author describes an encephalitis of horses which appeared in epidemic form in the province of Buenos Aires in the summer months of 1933, and later spread to other provinces and possibly to the adjoining republics of Chile and Uruguay. Isolated cases were observed at first, but centres of infection developed around them. The epidemic differed from a similar one observed in 1919, in that the mortality was generally as low as 2 to 5 per cent. There was, however, a mortality of 100 per cent. in some centres.

The early symptoms were those of extreme lethargy, contractions of groups of muscles and stumbling and falling when walking. Later, abnormal movements such as turning in small circles and continuous walking were observed, finally followed by paralysis and inability to stand. In fatal cases the duration of the disease varied from one or two days to 12 days.

Gross *post-mortem* changes were not specific, but microscopic examinations revealed acute inflammatory changes in the cerebrum and medulla. No specific lesions such as Joest-Degen corpuscles were observed. Streptococci were isolated from the cerebrum in two instances but, apart from this, bacteriological examinations of the carcasses gave negative results. The disease was reproduced in rats, guinea pigs, rabbits, goats and horses, but sheep or pigs could not be infected. Infective material passes through Berkefeld No. 7 filters. Recovered animals possess a solid immunity. The rapid disappearance of the disease as the cold weather approaches suggests the existence of an insect vector.

The author believes that the disease is identical with that described by MEYER, HARING and HOWITT in the United States of America, but that it is not identical with Borna disease.—R. S. ROBERTS.

VICHÉLSSKY, R. S., NASKOV, A., SOUKHOF, M., & MOUTOVINE, V. (1935). Méningo-encéphalo-myélite infectieuse du cheval en U.R.S.S. [**Infectious Equine Encephalomyelitis in the Union of Socialist Soviet Republics**].—*Rec. Méd. vét.* **111.** 357-364. [1 ref.]

The authors have made a study of infectious equine meningo-encephalomyelitis as it occurs in the U.S.S.R. They describe the symptoms shown by affected animals and demonstrate that a filtrable virus is responsible for the condition. The major part of the article relates to transmission experiments which were carried out with three strains of the virus, one of them having been obtained from an outbreak of the disease in Siberia. In addition to the horse, the cat, rabbit, guinea pig, rat, mouse and pig were found to be susceptible on experimental inoculation. The dog was not susceptible. In comparative studies with other Russian encephalomyelitis strains, a feature was the susceptibility of the

cat, which is not susceptible to the virus of Borna disease nor to the American strains of encephalomyelitis virus.

Other experiments refer to the demonstration of the virus in the liver, kidneys, saliva, urine and scrapings of intestinal mucous membrane of experimental cats.

In addition, mention is made of the viability of this virus, its resistance to chemicals and the properties of hyperimmune sera prepared against two of the strains. The sera possessed virucidal properties against homologous antigens and also against the virus of rabies, but were not virucidal to the virus of Borna disease and the eastern and western American strains of encephalomyelitis virus.—D. R. W.

ALMEYEFF, H. (1935). Lymphknoten und Milz bei der epizootischen Encephalomyelitis der Pferde. [**The Lymph Nodes and the Spleen in Equine Encephalomyelitis**].—*Dtsch. tierärztl. Wschr.* **43.** 535.

Encephalomyelitis of horses in Russia is an infectious disease caused by a filtrable virus. Sporadic and epizootic outbreaks have been observed in Russia for several years and the clinical symptoms are referable to changes in the central nervous system. *Post-mortem* examinations have shown that the brain and liver are particularly affected, but lesions are found in nearly every organ of the body, including the spleen and lymph glands, especially the periportal glands, which are enlarged ; the lymph nodes are also oedematous and hyperaemic and, on section, haemorrhagic infiltrations may be seen in the interstitial tissue. The spleen, on the other hand, shows no marked macroscopic changes. On microscopic examination, degenerative changes may be seen in the parenchyma and interstitial cells of the lymph glands and spleen, inflammatory exudative changes being pronounced. In the lymph nodes and spleen, the arterioles, capillaries and venules are congested and there is a perivascular granulocytic and lymphatic infiltration.—J. A. N.

DELLA MARIA, G. (1935). Encefalo-mielite infettiva dei bovini in Sardegna. [**Infectious Encephalomyelitis of Cattle in Sardinia**].—*Profilassi.* **8.** 54-56. [8 refs.] [English and French summaries : abst. from orig.]

Infectious encephalomyelitis of cattle is caused by a filtrable virus probably related to that of Borna disease. The brain is the first organ of the body to be attacked, then the lumbar portion of the spinal cord and finally the peripheral nerves. The cerebrospinal fluid increases and the arachnoid is affected, showing small haemorrhages. The spinal cord undergoes a gelatinous degeneration which also affects the peripheral nerves, especially the sciatic. The medulla of the long bones is haemorrhagic and the subcutaneous tissues, lymph glands and kidneys show a gelatinous infiltration. Symptoms set in gradually, usually beginning with excitement, weakness and uncertain gait ; an ascending paralysis then follows. The disease lasts 20 to 30 days in young animals and up to 90 days in adults, few recoveries occurring. No satisfactory treatment has been evolved and the prognosis is unfavourable.—J. A. NICHOLSON.

NIESCHULZ, O. (1935). Afrikanische Pferdesterbe. [**African Horse-Sickness**].—*12th Int. vet. Congr. 1934.* **3.** 358-371. 2 tables. [5 refs.] [English, French and Spanish summaries : abst. from orig. in German].

The author recapitulates experiments already reported [this *Bull.* **4.** 164, and **5.** 715.] on the natural vector of horse-sickness and the susceptibility of laboratory animals to infection with the virus of this disease. All search for the natural vector yielded negative results. Small rodents proved susceptible to heavy intracerebral inoculations of virus. The author was unable to effect any striking attenuation of virulence by mouse passage. [ALEXANDER with DU TOIT – this *Bull.* **5.** 75, and with VAN DER VYVER, 715. – have succeeded in attenuating virus and

rendering it neurotropic by prolonged mouse passage. Virus from the central nervous system of mice has proved satisfactory for vaccine purposes].

During the ensuing discussion, DU TOIT stated that in spite of negative results the natural vector of horse-sickness was still being sought amongst the night-flying insects. It is also of great importance that the natural reservoir of infection be identified. By the virus plus antiserum method of preventive inoculation about 2 per cent. of horses died under treatment and a breakdown of immunity only occurred in 3 per cent. if the inoculated horses were very well cared for. Amongst horses under ordinary farm conditions, losses and failures were probably much higher. Furthermore, the cost of this type of inoculation is excessive. Formolized virus did not prove effective for vaccination purposes, but virus passaged through mice for 100 generations became neurotropic in character and attenuated ; in this form it proved most effective for vaccination purposes in place of the simultaneous inoculation of virus and antiserum. Several major strains of virus were attenuated and incorporated into a polyvalent vaccine. Considerable serological difference was found to exist between various strains of virus but, from preliminary investigations, these differences appear to be quantitative rather than qualitative. Investigations also indicate that virucidal bodies develop very slowly in animals undergoing immunization, they reach a maximum in about five months and after the sixth month commence to disappear rapidly. —E. J. PULLINGER.

MORRIS, Marion C. (1935). **Rôle of Hog Cholera Virus in Production of Inclusions in the Conjunctival Epithelium.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 1281-1282. [15 refs.]

Swine fever virus was injected by the subconjunctival, subcutaneous, intraperitoneal and intravenous routes into healthy pigs [age and numbers not given] and all the animals exhibited the typical symptoms of the disease including conjunctivitis. They either succumbed to the infection or were killed when *in extremis*. No inclusion bodies could be found in conjunctival scrapings. Guinea pigs, rabbits and monkeys were also inoculated with the virus either by swabbing of the conjunctiva or by subconjunctival injection and here there followed neither signs of infection nor of inclusion bodies.

The results of previous workers who have recorded the finding of inclusion bodies in the conjunctival epithelial cells could not be confirmed, and the author concludes that such inclusion bodies, if they occur at all, are met so seldom as to have a limited diagnostic value.—E. G. WHITE.

I. DORSET, M. (1935). **Simultaneous Inoculation against Hog Cholera.**—*12th Int. vet. Congr. 1934.* **2.** 115-122. [12 refs.] [French, German and Spanish summaries].

II. MICHALKA, J. (1935). Schweinepest (Aktive Immunisierung). [**Active Immunization against Swine Fever**].—*Ibid.* 122-136. [English, French and Spanish summaries : abst. from orig. in German].

III. —. (1935). **Discussion of Papers on Hog Cholera.**—*Ibid.* 136-137.

I. Recent work on swine fever immunization has given rise to the idea that immunity against this disease is dependent upon the establishment of a permanent infection. This matter is obviously one of the gravest importance to pig farmers. As a result of a survey of relevant literature, as well as from an analysis of his own experiences, the author is of the opinion that immunity to this disease is not dependent upon a permanent infection. Furthermore, he considers that successful artificial immunization against this disease depends mainly upon the simultaneous use of virus of high virulence together with a potent antiserum. Following such

vaccination infection does not persist. In the United States of America, experiences of immunization against swine fever during the last 20 years are based upon the inoculation of about 300 million animals.

II. The author has compared the formolized virus and simultaneous methods of inoculating against swine fever and concludes that the latter method is the more reliable. He considers that the danger of establishing permanent carriers of infection as a result of the simultaneous inoculation is slight. The use of a potent antiserum lessens the danger in this respect. In the choice of a standard strain of virus for this inoculation, attention should be paid not only to the virulence of the strain but also to its antigenic capacity. Standardization of reagents and state control of antiserum and vaccine production is advocated.

III. The infection of pigs by feeding virus material to them in the course of immunization, after having administered antiserum, was discussed.—E. J. P.

FUTAMURA, E. (1935). Etude sur les vaccins contre la peste porcine au Japon et résultats des expériences dans la pratique. [**Experiences with Japanese Swine Fever Vaccines**].—*Bull. Off. internat. Epiz.* **10.** 16-52. Discussion pp. 410-415. 14 tables, 1 chart. [22 refs.]

In this paper the author gives an account of a comparative study of two forms of swine fever vaccine, followed by a discussion of the results which have attended the use of vaccines in the control of swine fever in Japan.

The two vaccines studied were a glycerinized vaccine and a formolized vaccine. The former consisted of a suspension of spleen and liver pulp from affected pigs in 60 per cent. glycerin-saline solution containing 0·5 per cent. phenol. The formolized vaccine was prepared by incubating a suspension of spleen and liver containing 0·1 to 0·2 per cent. formalin at 37°C. for 48 hours. Suspensions of other tissues and blood were not so efficacious.

Comparative work revealed the formolized vaccine to be the more satisfactory. It retained its antigenic power for a much longer time, and did not cause sclerosis or suppuration at the site of injection as was frequently the case with glycerinized vaccines. Although viruses from different sources were shown to have different antigenic values there was no evidence of the existence of more than one virus strain. Vaccines were usually prepared from the organs of several pigs. Two injections of the vaccine were given with an interval of 14 days. The first dose was 2 c.c. and the second 2·8 c.c. for every 15 kg. body weight. For rapid prophylaxis a single dose of 4 c.c. for every 15 kg. body weight was given. Vaccination has never given rise to the disease in Japan.

The author concludes by presenting and discussing statistics showing the influence of vaccination on the disease in Japan. He states that the formolized vaccine has proved to be a most efficacious way of arresting the spread of infection and preventing the disease from assuming epizootic proportions. It is regarded as the principal method of prophylaxis.

In the discussion which followed, LECLAINCHE, GERLACH, FLÜCKIGER, MANNINGER and LOPEZ took part and they stated their experiences with vaccines in their respective countries. In the course of the discussion it was stated that the Japanese results were certainly more favourable than those obtained in Europe. There also appeared to be some agreement that a dead vaccine was useless and that a live vaccine was dangerous owing to the risk of setting up infection and creating carriers. A commission was appointed to consider the question.—G. O. DAVIES.

DONATIEN, A., & LESTOQUARD, F. (1935). L'intradermo-réaction dans la peste du porc. [**The Intradermal Reaction in the Diagnosis of Swine Fever**].—*Bull. Acad. vét. Fr.* **8.** 325-336. 3 tables. [12 refs.]

The authors, using a skin measurement increase of 3 mm. as the critical index for the test, were unable to confirm SARNOWIEC's results, as they obtained very small (negative) reactions both in healthy and naturally infected cases, and only obtained large local (positive) swellings in pigs that had recovered from infection or had been immunized. They conclude that the reaction is, therefore, an indication of immunity, either recent or of long standing. In infected pigs the antigen increases the virulence of the virus and tends to precipitate the disease. —J. E.

DOUBRAVA, O. (1935). Těsínská nemoc vepřů. [**The Teschen Disease of Pigs. (Encephalomyelitis enzootica suum)**].—*Zverolék. Obz.* **28.** 93-97 and 115-119.

This is a specific disease of swine; other domestic animals are refractory. The causative agent is a filtrable virus. The viability of the virus is fairly great: it is killed by disinfectants commonly used in the sterilization of the swine fever virus. Natural infection takes place, as a rule, *via* the digestive tract. The greatest source of infection is the feeding of pigs with uncooked garbage from hotels, etc., containing brain and spinal cord tissue from infected pigs. The prognosis of the disease is very unfavourable: about 30 per cent. of infected pigs recover, most frequently young animals up to 30 kg. body weight. In older animals, pulmonary complications often occur.

All attempts at effective curative treatment with salicylic acid, iodine, methylene blue, "arsenite," caffein and "urotropine" have so far proved unsuccessful. Attempts are being made by KLOBOUK to prepare a specific immune serum.—E. P. (BRNO).

HORNING, E. S., & FINDLAY, G. M. (1934). **Microincineration Studies of the Liver in Rift Valley Fever.**—*J. R. micr. Soc.* **54.** 9-17. 6 figs. on 3 plates. [13 refs.]

A determination of the localization and inorganic composition of the inclusion body formed by the virus of Rift Valley fever has been made by means of microincineration. For this purpose, small pieces of liver were obtained from mice at varying periods after they had been inoculated with the virus, and incinerated, stained and examined along with sections from control mice. Changes in the localization of the mineral salts were noted and a yellow tinge, indicative of ferric oxide, was seen in the chromatin and nucleolus of the parenchyma cells of the liver. A thin line of mineral salts, representing the peripheral zone of the inclusion body, was observed in every case, which is considered as being evidence that these structures are not artifacts. No diminution of this ash was observed with varying degrees of development of the inclusion bodies.

A comparison was also made between the necrosis of Rift Valley fever and that experimentally produced by intraperitoneal injections of carbon tetrachloride. A marked difference in the localization and appearance of the mineral salts was noted in the necrosis produced by these agents.—J. A. NICHOLSON.

FRANCIS, T., Jr., & MAGILL, T. P. (1935). **Rift Valley Fever. A Report of Three Cases of Laboratory Infection and the Experimental Transmission of the Disease to Ferrets.**—*J. exp. Med.* **62.** 433-448. 4 figs. on 2 plates, 4 tables, 2 charts. [13 refs.]

Three cases of Rift Valley fever in man are recorded. In two patients, virus was demonstrated by inoculating intranasally into ferrets pharyngeal washings taken, in the case of the first patient, on the second day of illness and, in the case of the second patient, on the first day of illness. In the one case examined, virus was not found in pharyngeal washings taken on the eighth day. No virus was

found in pharyngeal washings from the third patient, but blood taken on the second day of illness proved infective for mice.

In the ferret, the lungs are constantly affected with a massive consolidation. Another feature is the presence of haemorrhages in various organs of the body. The liver may occasionally show necrosis, especially in the early passages. No specific inclusion bodies have been demonstrated. In the mouse, on the other hand, pulmonary lesions are not observed and the liver shows extensive necrosis and characteristic intranuclear acidophilic inclusions.

This necrosis of the liver in mice is a feature which also distinguishes Rift Valley fever virus from human influenza virus, which is similar in many respects, but produces no lesions in the livers of mice.

Convalescent serum from all three patients showed the presence of antibodies capable of protecting mice. Immune sera plus virus inoculated intraperitoneally did not produce infection, but, when immune sera plus virus were inoculated intranasally, infection resulted as readily as it did when healthy serum plus virus was inoculated by this route.—A. Brownlee.

Oleson, R. (1935). **Control of Rabies in New York City.**—*Publ. Hlth Rep., Wash.* **50.** 1087-1106. 3 figs., 11 tables. [7 refs.]

This paper gives the procedure followed from the time a person reports being bitten by a dog until the case is closed. It gives a mass of statistical information concerning the number of persons bitten, the number of deaths from rabies, the total number of bites by all animals, the total number of dog bites, the location of the bites, the number of rabid dogs, etc., for the years 1908 to 1934. The author reviews the regulations and is of the opinion that these have been concentrated too much on the biting animal and prophylactic measures for the bitten while they have omitted such important things as greater discrimination in selection, training and care of the dog and education of the public in dog-owning. [The hope of preventing dog bites by selection, care and training of the dog and by education of the dog-owner appears to be unduly optimistic.—Ed.] A decrease in the dog population by weeding out the unfit and by heavier penalties on all owners of biting dogs would materially reduce the number of cases.—G. Dods Munro.

Mattlet, G. (1935). Contribution à l'étude de la répartition des foyers de rage canine au Congo belge. **[Centres of Canine Rabies in the Belgian Congo].** —*Ann. Soc. belge Méd. trop.* **15.** 221-223. [2 refs.]

Repetto [see this *Bull.* **3.** 136.] published a list of districts in the Belgian Congo in which he had located rabies. Mattlet describes his investigations into the existence of rabies in the district of Urundi and expresses the opinion that that district should be added to the list as a permanent centre of rabies. The type present in Urundi is " oulou-fato ".—G. Dods Munro.

Villa, P. P. (1935). **Some Observations on Clinical Cases of Canine Rabies.**— *Philipp. J. anim. Indust.* **2.** 161-169.

An interesting account of rabies in dogs in Manila by the city veterinarian, who observed 156 cases between 1930 and 1934, most of them being in impounded stray dogs. Rabies was first officially recognized in the Philippine Islands in 1920, and in 1927 an order for compulsory vaccination of all dogs was passed but was not actually enforced. Impounded dogs are vaccinated before release to their owners and 8,680 dogs have been thus treated in the last seven years.

Villa describes the clinical character of canine rabies and states that the course of illness up to death never exceeds six days in Manila ; he is of the opinion

that dumb rabies does not exist, i.e. that every dog, if kept closely under observation, shows at least a short furious stage.

An unusual case of rabies in a six-weeks-old unbitten puppy is recorded. —J. E.

BALOZET, L. (1935). La vaccination antirabique des animaux en Tunisie du 1er janvier au 31 décembre 1934. [**Antirabic Vaccination of Animals in Tunis during 1934**].—*Arch. Inst. Pasteur Tunis.* **24.** 396-402. [3 refs.]

The application of preventive vaccination of dogs against rabies was enforced in Tunis in October, 1931. The vaccine used was prepared by the method of Remlinger and Bailly [see Balozet, L. – this *Bull.* **3.** 303]. Seventy-six animals were vaccinated after being bitten (26 dogs, 27 horses, 22 cattle and one camel), of which one bull developed rabies. 958 animals were vaccinated for preventive reasons, and 305 were revaccinated to maintain immunity. Since the commencement of antirabic vaccination, no dog recently vaccinated has contracted natural rabies in Tunis, but one animal, which had been vaccinated and not revaccinated for 18 months, did develop the disease. Five dogs, out of 1,339 animals vaccinated, developed symptoms suspicious of rabies following vaccination, but an analysis of these cases indicated that probably only two were rabies contracted from the vaccination.—U. F. RICHARDSON.

I. GIESE, C., & ZUNKER. (1935). Les possibilités actuelles de la prophylaxie de la rage. [**Prophylaxis of Rabies**].—*Bull. Off. internat. Epiz.* **10.** 53-66. Discussion pp. 380-399. 2 tables, 2 charts, 2 maps. [1 ref.]

II. EYRAUD. (1935). La prophylaxie de la rage au Maroc. [**Prophylaxis of Rabies in Morocco**].—*Ibid.* 67-86. Discussion pp. 380-399. 1 table, 2 charts. [5 refs.]

III. JEZIC, J., & KODRNJA, E. (1935). Essais d'immuno-prophylaxie de la rage des chiens en Yougoslavie. Note préliminaire. [**Prophylaxis of Rabies in Dogs in Yugoslavia**].—*Ibid.* 337-340.

I. After quoting from the previous reports to the Office international des Epizooties on the prophylaxis of rabies – by HUTYRA in 1928 and by BISANTI and KONDO in 1931 – the authors describe the method used with great success in Germany since before the war. Control is effected entirely by veterinary police measures and there is no vaccination of dogs. The main points of the law are :– compulsory notification ; destruction of rabid dogs or dogs suspected of rabies ; maintenance under veterinary observation for two weeks, if necessary, of suspected dogs or of dogs which have been in contact with rabid or suspected dogs ; in case of doubt, however, dogs in the latter category may be kept under observation for three months ; destruction of rabid or suspected farm animals on a police order and payment of indemnity ; isolation of all dogs for three months when a case of rabies has occurred in a district – all these provisions being in force within an area having a radius of 10 km.

Accessory orders assisting in the control of rabies include the compulsory use of dog collars bearing the owner's name, etc., and the dog tax, the metal plate receipt for which must also be worn. In spite of the heavy tax averaging RM.15 and rising to RM.60 for dogs in Berlin, for the four million dogs in Germany in 1926, the dog population has not fallen in recent years.

Statistics showing the incidence of rabies in animals and man in Germany since 1912 are given : they give proof of the success of the control measures. In 1934 there were less than 100 rabid dogs found and practically the whole of Germany except its frontier districts adjoining Poland was free. Only one man has died of rabies since 1930.

The authors finally plead for international co-operation in rabies control so that Europe may be freed entirely from the disease.

II. A history of the control of rabies in Morocco where, up to 1928, the only measures were those compelling dog-owners to muzzle and confine their dogs, and making provision for the destruction of rabid or suspected animals.

This left entirely unaffected the large numbers of stray, ownerless dogs, which constitute the main reservoir of rabies and aroused the owners of dogs to indignation at the harsh control to which they were subjected. This position has not even yet been materially improved but, in order to reduce the number of human cases, (it was considered that most of them arose from bites of the person's own dog which in turn had been infected by a stray), it was thought advisable to have preventive vaccination of owned dogs legalized and in 1928 the necessary decree was passed. Since then, 3,653 dogs have been immunized by the etherized vaccine of Remlinger and Bailly. The number of persons bitten has not decreased and it is deplored that immunization has not yet been adopted on a nearly wide enough scale.

Legal and technical details for the immunization of dogs are given. The Pasteur Institute of Tangiers has also prepared an etherized vaccine for use on cats.

A long and interesting discussion took place and Giese and Eyraud elaborated their theses, showing how the separate campaigns carried out in Germany and Morocco respectively represented the best ways of control. Eyraud gave in addition many details of the vaccines used in Morocco. DROUIN spoke in favour of police measures and against vaccination for use in France. LOPEZ described the position in Spain, where sanitary measures and vaccination are both employed. MARCZEWSKI said that in Poland there existed appropriate police measures and that vaccination (glycerin vaccine) had been used with success to a small extent. He asked whether immunized dogs, bitten by rabid dogs, could become carriers of the virus and spread it by the saliva : this was answered in the negative by Eyraud. FERREIRA gave information on rabies in Portugal. Vaccination has been widely used since 1925 and the incidence has decreased very much since that date.

LECLAINCHE concluded the discussion by advising the general adoption of police measures alone for European countries ; he admitted that vaccination was justifiable in such territories as Morocco, Tunis, etc. He referred to the fact that Great Britain, Sweden, Norway, Denmark, Holland, Switzerland and Belgium had now eradicated rabies. In France it only remains in a few isolated districts.

III. In Yugoslavia, rabies is controlled by an animal diseases law of 1928, which includes the measures recommended by the Office international des Epizooties in 1928 and 1931 [see I].

As the country is, however, badly affected with rabies, it was considered advisable to try vaccination as well. An etherized vaccine for use by a single subcutaneous injection was prepared and administered to some 4,400 dogs, 900 pigs and 40 sheep ; the results were very satisfactory judging from the cases of rabies observed before vaccination and one year later.—J. E.

MORENO, L. S. (1935). Consideraciones acerca de la epidemiologia de la rabia y del poder immunológico de la vacuna semple. [**Annotations on the Epidemiology of Rabies and the Immunizing Properties of Semple's Vaccine**].—*Rev. Hig. Sanid. pecuar.* **25.** 335-347. [19 refs.]

This paper contains the author's observations on rabies and rabies vaccination in Spain, particular attention being paid to failures encountered after vaccination by the established technique.

Since the beginning of 1933, the author has used Semple's modification of Fermi's formalin and ether attenuated vaccine in the routine immunization of human beings suspected of having been infected, and no failures have occurred.

The method has the practical advantage of not necessitating a stay at a large centre which, in the past, led many people to avoid treatment because of the expense.
—R. S. Roberts.

I. Lourens, L. F. D. E. (1935). La maladie d'Aujeszky (Pseudo-lyssa, paralysis bulbaris infectiosa, mad itch, mal de caderas, peste de cocar). [**Aujeszky's Disease. Infectious Bulbar Paralysis, Pseudo-Rabies, Mad Itch**].—*Bull. Off. internat. Epiz.* **10.** 199-240. Discussion pp. 400-407. [60 refs.]

II. Köves, J. (1935). La maladie d'Aujeszky (paralysis bulbaris infectiosa, pseudo-lyssa, pseudo-rabies, pseudo-rage, mad itch, juckpest). [**Aujeszky's Disease**].—*Ibid.* 241-272. Discussion pp. 400-407.

[These articles are important contributions to the subject of Aujeszky's disease, but they are mainly concerned with a general survey of the condition. It is unnecessary to prepare a complete abstract, but the following controversial points are of particular interest].

I. Lourens stated that he had been unable to confirm the observation of Hurst [this *Bull.* **4.** 349.] on the existence of inclusion bodies not only in nerve cells but also in other tissues. Nevertheless, corpuscles had been found in the cerebral tissue which resembled rickettsia. These results are discussed in relation to the studies of Remlinger and Bailly [this *Bull.* **4.** 731.] on the possible existence of a protozoan with a filtrable stage. Filtration experiments indicated that the virus was of relatively large dimensions or else was attached to fairly big particles. The virus persisted for more than three years in nervous tissue preserved in glycerin and was also comparatively resistant to desiccation. The influence of heat on the virus depended upon the conditions. Remlinger and Bailly [this *Bull.* **4.** 235.] have reported that heating to a temperature of 60°C. for 45 minutes failed to inactivate the virus, whereas Lourens states that, in a water bath, five minutes at this temperature was fatal. Contrary to the findings of other workers, all attempts at inducing infection by the alimentary tract were unsuccessful. These failures are attributed to the extreme sensitivity of the virus to the gastric juices, a dilution of 1 : 1,000 hydrochloric acid rendering emulsions inert almost instantaneously. It also proved impossible to transmit the disease by contact. Infected pigs were housed with susceptible cattle with every facility for the transference of the virus, but the cattle remained unaffected, a result which does not support the theories of Shope [this *Bull.* **6.** 130].

Lourens is strongly of the opinion that the virus may remain viable in the blood serum for long periods after withdrawal from the body, and attributes the outbreaks which have occurred in pigs in Holland to the use of anti-swine fever serum produced in animals suffering from the subacute form of Aujeszky's disease. He states that his own attempts to produce a potent anti-Aujeszky serum have been unsuccessful.

II. Köves draws attention to the uncertainty which exists regarding methods of infection. He considers that in pigs, cats and dogs the most likely route is the oral mucous membrane, infection taking place through the ingestion of infected rats. In ruminants, especially cattle, the skin or nasal mucous membranes may be the portals of entry of the virus. A potent antiserum produced in the pig induces a passive immunity not only in rabbits but probably in other animals. Active immunization can be effected by the serum-simultaneous method but, in view of the low mortality in natural outbreaks in pigs, this is regarded as too expensive for general use.

In the discussion which followed, Berger stated that in the Netherlands the

following measures have been recommended :—(1) the separation of pigs from cattle, (2) the avoidance of the purchase of pigs from unknown sources, (3) the extermination of rats from piggeries which should also be rendered mosquito-proof, (4) all deaths in cats, dogs, rabbits and rats to be reported to a veterinarian, and (5) the proper disposal of all carcasses.—R. E. Glover.

Nicolau, S. (1935). Etude sur les inclusions qui caractérisent la maladie de Carré (maladie du jeune âge du chien). [**Inclusion Bodies in Dog Distemper**]. —*C. R. Soc. Biol. Paris.* **119.** 269-272.

The author reviews the work of others who have made a study of the inclusion bodies met with in dog distemper and himself examined the tissues of four dogs which had succumbed to the disease. The inclusions, which are intracytoplasmic, were found in the glandular cells of the intestine, stomach, pancreas and parotid, in the spleen, lymphoid tissues, in the vascular endothelium of brain, spinal cord, spinal ganglia, lung, spleen and intestine, in the epithelium of the bronchi, in the cells of the pulmonary alveoli, in the kidneys, in the cells situated between the uriniferous tubules, in the mononuclear cells of the blood stream and in other tissues. They were also found in the glial cells of the grey and white matter of the brain and spinal cord and, only exceptionally, in the cytoplasm of the neurons. The bodies vary considerably in size : the largest may be 10μ in diameter. Some are structurally homogeneous, others are vacuolated.

The terms *Negria canis* and *Encephalitozoon negrii* should be discontinued, as they are suggestive of parasites. The author considers that the bodies characterize distemper in the same way as the bodies of Joest-Degen characterize Borna disease and Negri bodies characterize rabies.—D. R. Wilson.

Lépine, P., & Haber, P. (1935). Inclusions leucocytaires dans la peste aviaire. Démonstration de leur non-spécificité par l'électropyrexie. [**Leucocytic Inclusions in Fowl Plague. Demonstration of their Non-Specific Character by Electropyrexia**].—*C. R. Soc. Biol., Paris.* **119.** 1083-1086. 1 fig. [4 refs.]

The authors refer to the work of Gilbert and Simmins [this *Bull.* **2.** 445.] on cell-inclusion disease and state that inclusion bodies have been seen in the blood of fowls suffering from fowl plague and that it is probable that the two diseases are due to the same virus. The authors have been able to demonstrate that, in cases of fowl plague, 25 to 40 per cent. of the leucocytes show these inclusion bodies, and even in normal fowls 0·2 to 3 per cent. of the leucocytes may contain them. Their numbers in the circulating blood of normal fowls are increased seven or eight times by producing artificial fever by electrical means. Thus, the inclusion bodies which occur in the large mononuclear leucocytes and lymphocytes of birds are non-specific in character.—J. A. Nicholson.

Walsh, V. G., & Frazer, A. C. (1934). **The Effects of Subcutaneous and Intravenous Injection of Toxins combined with Fine Emulsions of Oils.**—*Brit. med. J.* March 10th. 424-425. [1 ref.]

The authors found that bacterial toxins could be adsorbed by an emulsion of 3·5 per cent. olive oil or cod liver oil in sodium carbonate. [For the technique for the preparation of the emulsions, see *J. Physiol.* (1933). **78.** 467].

Rabbits inoculated subcutaneously with 5 M.L.D. of diphtheria toxin adsorbed to the above emulsion remained healthy. Rabbits inoculated subcutaneously with 5 M.L.D. of tetanus toxin in oil also survived, but death occurred when this mixture was injected intravenously or intraperitoneally. The oil emulsion must be a very fine one to be able to inactivate toxin.—J. E.

Schmidt, S., & Ørskov, J. (1935). Eksperimentelle studier over hønsepest. [**Experiments on Fowl Plague**].—*Maanedsskr. Dyrlaeg.* **47.** 145-164. [13 refs.] [English summary : abst. from orig.]

A report of an extensive study of fowl plague virus in mice. The virus was found to be readily adsorbed on aluminium hydroxide ; it was not released from the latter *in vitro*, but *in vivo*, after intraperitoneal injection, it was released and the inoculated animals died of the infection. After subcutaneous inoculation, however, it was not released regularly, judging by results, as some mice died quickly, some acquired a chronic infection and others remained healthy and acquired some degree of immunity so as to be able to resist artificial infection with virus alone.

In the chronic type of infection the virus, on recovery and passage into susceptible mice, was found to be of low potency. In such cases continued passage resulted in loss of virulence. Mice immunized by virus adsorbed on to aluminium hydroxide were found to contain antibodies in their blood, as fresh animals could be inoculated with a mixture of virus and blood from such mice without becoming infected clinically.

It was found that, after infection with fowl plague virus, the virus was taken up by the reticulo-endothelial system where it appeared to multiply before being released into the blood and body organs.

Attempts were made to confer active immunity on fowls and mice against fowl plague by injecting repeated doses of mixtures of aluminium hydroxide and virulent mouse brain extract, both fresh and after keeping for five to six months at 20°C., or virus attenuated by passage through mice. The results were encouraging.

The oil emulsion of Frazer and Walsh [see previous abst.] was found to be able to inactivate fowl plague virus but the results of mouse tests indicated that it was unsuitable for making a vaccine.—H. C. Bendixen (Copenhagen).

Schmidt, S., & Ørskov, J. (1935). Adsorption du virus de la peste aviaire par l'hydroxyde d'aluminium. [**Adsorption of Fowl Plague Virus by Aluminium Hydroxide**].—*Acta path. microbiol. scand.* **12.** 262-273. [14 refs.] [In French].

Fowl plague virus is stated to be pathogenic for mice, rats, young guinea pigs and young rabbits. Repeated passage of the virus through mice attenuates it. Adsorption of this attenuated virus by aluminium hydroxide forms a mixture which is innocuous for mice but has antigenic properties. The authors consider that repeated injections of such mixtures containing aluminium hydroxide and brain tissue of gradually increasing virulence promise to form a useful method for vaccinating poultry.

Using brain tissue from mice as a source of virus, the authors failed to produce an attenuated form either by formol or by desiccation according to Pasteur's method. They also failed to filter the virus through Seitz filters which were sufficiently fine to retain ordinary bacteria.—Gwilym O. Davies.

Ørskov, J., & Schmidt, S. (1935). Sur l'effet de l'injection à des souris et à des poules du virus de la peste aviaire en mélange avec l'émulsion d'huile de Frazer et Walsh. [**The Effect of the Injection into Mice and Fowls of Fowl Plague Virus Mixed with Oil Emulsion**].—*Rev. Immunol.* **1.** 353-364. 1 table. [10 refs.]

This article records experiments on the effect on fowl plague virus of mixing it with oil emulsified in water by Frazer and Walsh's method. This oil emulsion has been shown to be capable of destroying the lethal power of both diphtheria

and tetanus toxin. The experiments indicated that various emulsions of fats possessed the power of inactivating large quantities of fowl plague virus, but that mice or fowls which failed to succumb to the inoculation of the virus-emulsion mixture had not obtained any immunity to the virus. Working with diphtheria anatoxin, it was also found that the addition of oil emulsion did not increase the antigenic value.—U. F. Richardson.

Bierbaum, K. (1935). Ueber die Möglichkeit einer staatlichen Prüfung der im Handel befindlichen Impfstoffe zur Schutzimpfung gegen Hühnerpocken. [**Possibility of Government Testing of Commercial Fowl Pox Vaccine**]. —*Arch. wiss. prakt. Tierheilk.* **68.** 322-327. [5 refs.]

This article discusses the practicability of the government testing in Germany of commercial fowl pox vaccine. The writer concludes that the immunizing effect and the harmlessness of a vaccine can definitely be established provided that the expense and the length of time spent upon the experiments need not be considered. This might be done by injecting batches of ten fowls according to the instructions given and three weeks later exposing them to contact infection with controls.

In the present state of knowledge, it is considered impossible to carry out regular government testing of fowl pox vaccines before their distribution. It must be left to the institutes dealing with these vaccines to satisfy themselves from time to time as to the harmlessness and effectiveness of their products.—K. D. D.

Burnet, F. M. (1935). **Enzootic Psittacosis amongst Wild Australian Parrots.** —*J. Hyg., Camb.* **35.** 412-420. 1 table. [9 refs.]

A preliminary survey of infection amongst Australian parrots was carried out, using birds many of which were purchased from dealers. These had probably all been caught in the wild state and had been in captivity for relatively short periods, but under crowded conditions which would facilitate the spread of infection. The common species from these sources were frequently found to be infected. Birds newly arrived from the country were also found to be infected.

It is stated that if it can be accepted that the birds examined were a fair sample of the species which they represent, it may be concluded that grass parrots (*Psephotus haematonotus*) and cockatiels (*Leptolophus hollandicus*) from Victoria, and Queensland lorikeets (*Trichoglossus* spp.) are heavily infected in the wild state. Rosellas (*Platycercus* spp.), cockatoos (*Kakatoe galerita*) and galahs (*K. roseicapilla*) were much less frequently found to be infected. In other genera demonstrable infection was rare, but enlarged non-infective spleens probably indicative of past infection were common.

The virus strains which have been isolated from recently caught Australian parrots are undoubtedly true psittacosis strains. They appear to be of distinctly lower virulence for mice than most of the strains described from cases of the disease in man, and show a greater tendency to produce peritonitic rather than liver lesions after intraperitoneal inoculation.—Norman Dobson.

Francis, T., Jr., & Magill, T. P. (1935). **Immunological Studies with the Virus of Influenza.**—*J. exp. Med.* **62.** 505-516. 3 tables. [8 refs.]

A series of experiments has confirmed the observations of Laidlaw [this *Bull.* **5.** 714.] that various strains of influenza virus recovered from human cases are immunologically identical, whereas they differ from the swine influenza virus on serological grounds. In addition, it is shown that the serum of a horse immunized by the English investigators [Laidlaw, Smith, Andrewes, & Dunkin – this *Bull.* **5.** 812.] neutralized two American strains isolated by the authors.

This unicity of the human strains was also reflected in experiments in ferrets for, in addition to possessing neutralizing antibodies in their sera, ferrets recovered from infection with one strain were also immune to the others. This protection usually lasted for about four months. Rabbits injected intraperitoneally with large and repeated doses of virus showed no febrile reaction or any other evidence of infection, but their sera subsequently contained neutralizing antibodies. Similarly, mice inoculated subcutaneously or intraperitoneally with the virus were immunized against infection by the nasal route.—R. E. Glover.

Shope, R. E. (1935). **The Infection of Mice with Swine Influenza Virus.**—*J. exp. Med.* **62.** 561-572. 1 table. [11 refs.]

In this paper, Shope confirms and extends the observations of Andrewes, Laidlaw and Smith [this *Bull.* **5.** 137.] on the transmission of the virus of swine influenza to white mice. Two field strains were adapted to this species by the intranasal route, one becoming pathogenic in its first passage, whereas the other required two or three transferences to acquire full pathogenicity. As is the case with the ferret, a single passage of the original pig material through the mouse removed *Haemophilus influenzae suis*, a pure virus infection resulting. A prolonged serial transference of the virus in mice did not affect its pathogenicity for the ferret or the pig. It was noted that the mouse disease was not contagious.

Cross-immunity experiments with serum from animals immune to the virus of human influenza confirmed the results of Francis and Magill [see previous abstract].—R. E. Glover.

Jármai, K. (1935). Tumorerzeugung mit dem Leukoseagens der Hühner. [**The Production of Tumours with the Virus of Fowl Leucosis**].—*Arch. wiss. prakt. Tierheilk.* **69.** 275-285. 6 figs. [11 refs.]

Grafts were made in the breast muscles of three fowls with fragments of abnormal bone-marrow, spleen and liver from animals suffering from leucaemia. The two which received marrow and spleen died of leucaemia within two to three weeks. The one which received the liver implant showed by the eighth day the local development of a nodule which, by the 15th day, was about the size of a hazel-nut. A portion of this was used for transplantation into other birds. Further tumour formation was demonstrated in this way in spite of the early death from leucosis of all recipients.

Histologically, three zones could be recognized in the nodule, a detailed description of which is given. The central zone was characterized by fusiform cells showing no karyokinesis. The second zone contained star-shaped cells and mitotic figures were plentiful. The peripheral zone showed mainly round cells. The significance of these histological findings is discussed at length. It is concluded that fowl leucosis is a neoplasmogenic affection.—E. J. Pullinger.

Goyal, R. K. (1935). **Experiments on Reactivation of the Virus in Neutral Serum-Virus Mixtures.**—*J. Immunol.* **29.** 111-132. 17 tables. [13 refs.]

The author has dissociated serum-virus mixtures by dilution, adsorption, and euglobulin precipitation methods. Experiments with the viruses of vaccinia and " louping ill " show that antigen-antibody union can occur *in vitro*, provided that the immune serum in the mixtures heavily over-neutralizes the virus, e.g. is 10 to 100 times greater than the amount required for neutralization. The nature of this reaction is more comparable to a bacterial destruction than to a toxin-antitoxin neutralization. It was also noted that " louping ill " virus can be inactivated *in vivo* by its antiserum without any *in vitro* contact.—Norman Hole.

ARTHROPODS IN RELATION TO DISEASE.

Degtyarev, M. (1932). **The Warble Fly and its Control.**—*Novosibirsk. Sibirsk. Inst. Zashch. Rast.* pp. 44. 35 figs., 3 tables. [In Russian]. [45 kop.] [Abst. from abst. in *Rev. appl. Ent.* **23.** 178-179].

A programme is outlined for the control of warble flies in the U.S.S.R. Both *Hypoderma bovis* and *H. lineatum* are widely distributed and cause heavy losses. Various larvicides were tested and it was found that injections of creolin into each warble, or two injections, on successive days, of 5 per cent. carbon tetrachloride, killed all larvae. Various ointments are also recommended.

Lührs, E. (1935). Ueber den Einfluss des Lichtes auf die Wanderung der Dassellarven im Tierkörper. [**The Value of Ultra-Violet Rays in the Migration of Warble Fly Larvae in the Animal Body**].—*Dtsch. tierärztl. Wschr.* **43.** 449-452. 2 tables, 1 chart. [1 ref.]

This paper reviews some of the previous publications on this subject. It also deals with the beneficial effect of ultra-violet radiation and calcium bilactate on young cattle. The author investigated the possibility of meteorological reports providing data for combating warble infestation, but an examination of the mean temperatures and the percentage of affected animals for the years 1925 to 1933 showed that temperature played no part in the life-cycle of the warble fly, and these reports were of no value in forecasting the extent of the disease the following year.

As the duration of sunshine does play a part, he assumed that the factor might be the ultra-violet rays. He investigated that aspect and gives details of his investigation. For this he used four groups of three young cattle each. Groups 1 and 2 were exposed to ultra-violet radiation ; groups 1 and 3 were given 30 g. of calcium bilactate daily in their food ; group 4 was used as a control. His investigation lasted from January 15th to March 31st, 1935. He found that in the groups that were exposed to ultra-violet rays the migration was delayed about 14 days ; after that interval, however, the migration occurred.

He analyses his findings and forms the opinion that both ultra-violet rays and calcium bilactate are factors which accelerate the migration of the larva, thereby bringing it to its normal position on the back earlier in the spring and thus facilitating its destruction as it can then be dealt with by means of a parasiticide. He considers that the beneficial effect on the cattle compensates for the financial outlay incurred.

—G. Dods Munro.

Beveridge, W. I. B. (1935). **Urine Soiling in Ewes in Relation to Blowfly Strike.**—*Aust. vet. J.* **11.** 104-106. 1 fig. [2 refs.]

Observations on blowfly "strikes" in the crutch of ewes showed that twice as many were "struck" on the left side as on the right. The tip of the vulva was found to be distorted to the left in 20 per cent. of ewes and to the right in only 8 per cent. Observations showed that urine soiling – the main factor in susceptibility to strike – mostly takes place from the drips remaining on the tip of the vulva after urination. Distortion of the tip of the vulva is sometimes due to the tail pressing on it. Absence of the tip of the vulva may also lead to soiling : it is sometimes cut off during shearing.

Beveridge, W. I. B. (1935). **The Mules Operation. Prevention of Blowfly Strike by Surgical Measures.**—*Aust. vet. J.* **11.** 97-104. 3 figs. [5 refs.]

It was reported earlier that Mules, a sheep breeder, had devised a means of

surgically removing the skin wrinkles from the crutch of ewes, and claimed that this procedure very materially reduced the ewes' susceptibility to blowfly strike. Mules has more recently found that these wrinkles can be more rapidly and as efficiently removed with "Rolcut" sécateurs, and he has also devised some other minor surgical procedures for the same purpose. These latter include cutting the tail shorter than usual and straightening laterally distorted vulvae. The procedure is described in detail. Beveridge considers that the operation will prove of great value, as skin wrinkles of the crutch have been shown to determine very largely the susceptibility of ewes and this operation provides a very cheap, simple and effective way of removing them. A large-scale experiment has been initiated.

Delevoy, M. G. (1934). A propos des incendies précoces des herbes. (Réserves forestières, pâturage et contrôle des glossines en Afrique tropicale). **[The Burning of Vegetation in the Control of Tsetse Flies]**.—*Bull. R. Inst. colon. belge.* **5.** 726-734. [7 refs.]

Delevoy considers that it is no longer necessary to regard forest preservation as incompatible with the fight against *Glossina*. He believes that the establishment and rational control of forest reserves by early firing, etc., (at all events in savannah areas) may be a practical means of eliminating *G. morsitans* from large areas, as well as being of economic value on account of the improvement both in the forests and in human and animal health.—J. S. Steward.

Legg, J. (1935). **The Australian Cattle Tick** (*Boophilus microplus*) : **The Time between Dipping and Removal of Cattle Necessary to Protect Free Areas.** —*J. Coun. sci. industr. Res. Aust.* **8.** 133-136.

A series of experiments was carried out wherein larval ticks were applied to cattle 36 hours after dipping in the usual arsenical solution. In some cases the cattle were sprayed with water after dipping to simulate rain. In control animals not dipped, thousands of ticks reached maturity, whereas in the dipped animals over 99 per cent. of ticks died. Spraying with water after dipping allowed a few more ticks to develop, but the mortality was about 93 per cent. The experimental infestation was exceedingly heavy, and it is concluded that there is only a very remote possibility that under field conditions any ticks picked up within 36 hours of dipping would mature.—W. I. B. Beveridge.

Schulze, P. (1935). Acarina : Ixodoidea. **[Acarina : Ixodoidea]**.—*Wiss. Ergeb. niederl. Exp. Karakorum Zool.* pp. 178-186. 9 figs. [12 refs.] [Abst. from abst. in *Rev. appl. Ent.* **23.** 139].

The following ticks were collected from the Karakorum Mountains, Kashmir :– *Rhipicephalus pumilio* n.sp., *R. sanguineus* Latr., *Hyalomma asiaticum* n. subsp. *citripes* and *Dermacentor daghestanicus* n. subsp. *sillemi*. A key is given to the Asiatic species of *Rhipicephalus*.

—. (1935). Preussen. Runderlass des Reichs- und Preussischen Ministers des Innern, betr. Räude der Schafe. **[Incidence and Treatment of Sheep Scab in Prussia]**.—*Reichsgesundheitsblatt.* **10.** 959. 1 table.

In Prussia, 4,722 sheep were treated for sheep scab in 1934 as against 4,385 in 1933. Treatment with baths of calcium sulphide, creolin, carboxol, or "Siemerling's non-poisonous wash" was carried out on 2,803 sheep, and ointment treatment with tobacco, creolin, lysol-creolin-tobacco, or grey mercurial ointment on 1,919 sheep, the results showing that the latter method is the less effective.—F. Bullock.

Schmitt, I., & Pohlmann, H. (1935). Ein Beitrag zum Vorkommen der Larven von Linguatula rhinaria (Pentastomum denticulatum) bei der Ziege. [**The Occurrence of Pentastome Larvae in the Goat**].—*Dtsch. tierärztl. Wschr.* **43.** 435. [5 refs.]

Pentastome larvae appear to have been reported in the literature only once previously as occurring in goats. The authors of this note record a heavy infestation in a nine-year-old goat which died in an emaciated condition, as a result, it was considered, of the pentastome infestation. At *post-mortem* examination the abdominal cavity was found to contain between 1 and 2 litres of fluid, and there were other signs that peritonitis had been the direct cause of death. Several swellings, the size of pigeons' eggs, were found in the mesentery, close to the small intestine ; these contained pentastome larvae. An attempt was made to trace the origin of the infestation, but without success.—E. L. Taylor.

DISEASES CAUSED BY HELMINTH PARASITES.

Haji, C. S. G. (1935). **Preliminary Notes on a Disease of Sheep and Goats Locally known as " Phet or Pitto ".**—*Indian vet. J.* **12.** 18-21.

This is a chronic disease of sheep and goats in India and occurs in localities which are subject to periodic inundations. The symptoms described are those of parasitism. The course of the disease may be as long as two months and the mortality is high. Chronic enteritis is observed on *post-mortem* examination ; this is believed to be due to parasites which are usually present in large numbers. In some cases, large numbers of the immature trematode, *Paramphistomum cervi*, are present in the intestinal submucosa. While other parasites may be present, it is believed that the infestation by the immature trematode throughout the intestines is probably sufficient to account for the symptoms.—D. R. Wilson.

Dew, H. R. (1935). **Advances in our Knowledge of Hydatid Disease during the Twentieth Century.**—*Brit. med. J.* Oct. 5th. 620-622. [7 refs.]

During the twentieth century it has become recognized that direct contact with dogs is the most common source of human infection and that water supplies and raw vegetables are of comparatively little importance ; there is, however, little exact knowledge of the survival period of onchospheres as also of scolices under natural conditions. The most important advance in our knowledge of the pathology has been Dévé's discovery of the occurrence of secondary echinococcal disease, resulting from the rupture of fertile cysts. It has become recognized that the great majority of infestations occur in childhood and the anaphylactic nature of many symptoms has gradually been realized. The application of radiography and of the intradermal test (introduced by Casoni) represent great advances in diagnosis.—E. L. Taylor.

Roberts, F. H. S. (1934). **The Large Roundworm of Pigs, Ascaris lumbricoides L., 1758. Its Life History in Queensland, Economic Importance and Control.**—*Bull. Qd Dep. Agric. Stock. Anim. Hlth Sta.* No. 1. pp. 81. 28 figs. on 8 plates, 13 tables, 4 graphs. [94 refs.]

A. lumbricoides is very prevalent in Queensland, figures showing that 20 per cent. of 46,433 pigs slaughtered at various points throughout the state were carrying infestation. It is considered to be of major pathogenic importance among young pigs, in which it is thought to be the principal cause of unthriftiness and retarded growth and not infrequently a cause of death. Although less prevalent than *Strongyloides* sp., *Stephanurus dentatus* and *Oesophagostomum* spp., its economic importance " is perhaps only approached by *S. dentatus* ".

Experiments with the eggs showed that development was considerably retarded at 3 cm. in damp earth, while in urine-soaked earth it was completely inhibited. Observations were also carried out on the reactions of the eggs to light, heat, cold, dryness and chemical substances, confirming many of the observations of other workers. Figures obtained showed that, of 904 four to five-month-old pigs, 36·8 per cent. were infected, of 4,400 six to nine-month-old pigs, 19·9 per cent. were infected, and of 587 pigs, mostly over two years old, only 4 per cent. were infected ; the decreased incidence in older pigs is thought to be due, in part at least, to an acquired resistance as suggested by one of the author's experiments. The experimental feeding of " enormous doses " of eggs to pigs resulted in marked respiratory disturbances which would, doubtless, have lead to death had the observational period been extended, but daily doses given over a period of 107 days in which two young pigs, starting at the age of seven days, ultimately received 1,292,000 eggs between them, did not lead to any marked disturbance in health. It is considered, however, that under natural conditions, pigs may pick up many more eggs than were given in that experiment and often sufficient to produce the lung symptoms, which are considered to be the result of combined traumatic and toxic action. Frequent cleaning in yards constructed in a sanitary way, and the use of some such system as the McLean County Swine Sanitation System are considered to be the most efficient methods for the control of this parasite. —E. L. Taylor.

Sarles, M. P., & Stoll, N. R. (1935). **On the Resistance of the Cat to Superimposed Infection with the Ascarid,** *Toxocara cati.*—*J. Parasit.* **21.** 277-291. 2 tables, 4 graphs. [6 refs.]

Eggs of *T. cati* were fed in single, small and large doses and in weekly constant or increasing doses to cats of different age groups, which already carried natural infestations with *T. cati*. The infectivity of the eggs was tested by finding migrating larvae in the lungs of guinea pigs to which the eggs had been fed. Rats, mice and rabbits could also be infected. Some cats were fed on guinea pig lung thus infested with migrating larvae, as well as on eggs.

Egg counts and worm counts showed that these doses failed to establish more than a small superimposed infection in either kittens or older cats. The migrating larvae in the lungs of cats did not grow as do those of *Ascaris lumbricoides* in swine. This uniformly high resistance of domestic cats to superimposed infection with this nematode was not due to use of a non-infective strain of nematode, nor to the abnormal resistance of the hosts. Kittens were as resistant as older cats, so that age-resistance was an unlikely explanation. No evidence of acquired immunity was found. Clinical effects of the infestation were slight, vomiting and spasms of sneezing and coughing being observed. Prenatal infection probably often occurs. Owing to the slow development of the worms there is a long period during which faecal examinations may not reveal the presence of infestations.

The resistance appears to be due to :– (1) factors which apparently prevent all but a few larvae from reaching the small intestine : many eggs fail to hatch in the intestine and are passed in the faeces or vomited : Stoll's observation that eggs of *A. lumbricoides* need a period approximately as long as that needed for embryonation before they become infective applies also to eggs of *T. cati* : only a small fraction of the dose given is ever recovered from the lungs and less from the intestine, so that many larvae are lost during migration, and (2) unknown factors acting on ascarids that have reached the intestine : these retard growth of the nematodes and cause decreased egg production, shorten the duration of the infection and cause expulsion of all stages in the development of the worms by vomiting or in the faeces.—G. Lapage.

WAGNER, H. (1935). Ein Beitrag zum Sklerostomenbefall der Pferde, unter besonderer Berücksichtigung der Verhältnisse bei den Fohlen. [**Strongylosis in Foals**].—*Dtsch. tierärztl. Wschr.* **43.** 401-406. 1 fig.

This is a record of work upon the incidence of strongyle eggs in the faeces of foals at different ages and seasons. At one to two days old, 24 foals showed no eggs. Ninety-five foals were examined weekly for 40 weeks. Eggs appeared in 3 at the end of the first week, and in 15 by the second. From then up to 20 weeks only a few animals showed worm eggs, but at 21 to 30 weeks, 20 animals were positive and at 31 to 40 weeks 14 foals had worm eggs. All the above animals were born between January and May. At first, they were kept in separate loose boxes with their dams, and later in pastures with common shelters. The increase after 21 weeks is due to weaning, the weakening of the bowel wall, and lowered resistance. Foals' mouths often have traces of the dam's faeces on them in the morning. When attempts were made to free the dams from eggs by treatment, it was found that in four weeks eggs began to reappear.

It was not possible to keep the 95 animals under observation for three years, but 80 were infested at the end of one year, 50 at two years, and 17 at three years. The egg counts in these groups were proportional to 11, 5 and 3 per animal. Sucking foals are therefore least troubled, the percentage of infected animals rises during weaning, and reaches a turning-point at the end of the first year.

Under changing conditions, some authors have reported no variation in the egg counts at different seasons, others have found higher numbers in May and June, and yet others in February. Fewer numbers have been encountered from July to September. Sixty-six foals, 9 to 18 months old, yielded on an average 14 eggs per cover-slip in February and March, but in April and May only five eggs.

During February and March, the foals were stabled, but in April and May they were at grass. In August and September 43 of these foals harboured an average of nine eggs each. From a table of monthly examinations over a period of 20 years, it appears that the greatest numbers of eggs are voided during spring and autumn. Explanations of the relationship of the egg-count to symptoms are offered. These are influenced by cold, errors in feeding, attention, change of coat, climate and other factors.

It is difficult to stop infection at the source and, although lasting egg-freedom is the ideal, a reduction of losses to negligible proportions ought to be considered satisfactory.

After discussing the advantages and disadvantages of several " worm cures " given by various routes, the author recommends biannual treatments in the food during February, March and September or October, i.e. before the animals go out to grass and when they come in again. Under grazing conditions animals rarely remain free from eggs for more than four weeks. The methods advocated for faeces in the fields are collection, lime treatment and copper sulphate. By such measures, sclerostomes can be controlled but not exterminated.—A. W. N. PILLERS.

JANDA, J. (1935). Histologický obraz strongylosy plic u vepře. [**Histological Picture of Strongylosis of the Lungs in Swine**].—*Zverolék. Rozpravy.* **9.** 56-60, 65-72, 78-84 and 90-96. [16 refs.]

The author studied the histological changes in the lungs of 21 pigs slaughtered for human food. In every case the same parasite, *Metastrongylus elongatus*, was found. The histological changes caused by the parasite are localized chiefly in the bronchi, whereas the changes in the parenchyma of the lungs are comparatively very small or absent. In the bronchioles, hypertrophy of the muscular layer of the wall is typical. In most cases examined, the eosinophile leucocytes were accumulated in the propria mucosae or around the parasitic nodules. Parasitic

nodules are not often found; they are formed by lymphocytic elements and granulation tissue and the parasite or its embryo is situated in the centre. —E. Pribyl (Brno).

Porter, D. A. (1935). **Studies on the Effect of Milk Diet on the Resistance of Rats to** *Nippostrongylus muris*.—*Amer. J. Hyg.* **22.** 467-474. 3 tables. [9 refs.]

There have recently been several reports on the effect of deficient diet in lowering the resistance of a host to parasitism by helminths. The author here reports on three experiments on the effect of a diet of whole milk on the resistance of rats to infestation with *N. muris*, the diet being chosen because of its deficiency of iron (this is so marked that rats on this diet alone will develop severe secondary anaemia). Diets of dry powdered whole milk, and of moistened powdered whole milk were compared with the regular stock diet of grain and with a diet of powdered milk supplemented with a mixture of ferric citrate and copper sulphate. It was found that a greater number of adult worms developed in the rats on the whole milk diet than in those on the adequate stock ration, the difference being observed both in rats which had not previously been infected and in rats which had acquired a relative resistance as a result of previous infestation. Although the addition of iron and copper to the milk ration increased the resistance of the rats on a milk diet, it did not raise it to the level of those on the full ration.—E. L. Taylor.

Bennetts, H. W. (1935). **The Hookworm Monodontus trigonocephalus and Other Sheep Parasites not Recorded Previously from Western Australia.**—*Aust. vet. J.* **11.** 113-114. [3 refs.]

The writer records the first finding of *M. trigonocephalus* in Western Australia (1934). Five weaned lambs from the south-west were infected with from nine to 89 worms each while, some months later, 33 worms were found in another lamb from the same district. The first flock was also heavily infested with *Haemonchus contortus* and small trichostrongyles (chiefly *Nematodirus filicollis*), and from it were recorded for the first time *Ostertagia trifurcata* Ransom, 1907, *Cooperia curticei* Railliet, 1893, and *N. spathiger* Railliet, 1896.—H. McL. Gordon.

Foster, A. O. (1935). **Further Observations on Prenatal Hookworm Infection of Dogs.**—*J. Parasit.* **21.** 302-308. [27 refs.]

Foster has previously demonstrated the ease with which prenatal infestation with *Ancylostoma caninum* may be brought about where the pregnant bitches are exposed to repeated doses of infective larvae. In the present paper, he reports observations on four bitches which received a single dose each of infective larvae during the period of gestation, 2, 5, 9 and 32 days respectively previous to the birth of their puppies. The " cat strain " of *A. caninum* was used in the instance where the dose was given only two days before parturition. Three of the four experimental bitches were markedly resistant to hookworm infestation, and it is pointed out that the observation is difficult to reconcile with a serological explanation of resistance to worm infestation.—E. L. Taylor.

—. (1935). **The Control of the Nodule Worm of Sheep** (*Oesophagostomum columbianum*).—*J. Coun. sci. industr. Res. Aust.* **8.** 140-141.

In connexion with the treatment of *O. columbianum*, details are given of results obtained at the McMaster Laboratory, Council for Scientific and Industrial Research, Sydney, by means of an enema treatment with sodium arsenite. The drug is administered with a special drenching gun fitted with a rubber nozzle. A high degree of efficiency has been obtained, but certain necessary precautions are outlined.—H. McL. Gordon.

TAYLOR, E. L. (1934). **The Epidemiology of Parasitic Gastritis in Sheep. Observations on the Relative Importance of the Various Factors Concerned in the Development of the Disease.**—*J. agric. Sci.* **24.** 192-208. [8 refs.]

As a result of a detailed survey of nine outbreaks of parasitic gastritis, Taylor arrived at the following conclusions. There are two epidemiological types of the disease :– (a) where pathogenic infestation is acquired from a residue of infective larvae on the land, and (b) where it results from auto-infestation, the larvae in the land originating from the sheep there. Severe haemonchosis can develop (from auto-infestation) within as short a time as seven weeks and severe ostertagiasis (from residual infestation) within four weeks. The residue of infective larvae where sheep have been penned over a field may vary greatly in different parts of the field. Six days are sufficient for the mass development of infective larvae under actual field conditions. Bare pastures are a danger as conditions are then optimum for the acquisition of infective larvae. There is an enormous difference between the suitabilities of various field conditions for larval development. The risk of pathogenic infection is much greater on arable land, where precautions are not strictly observed, than on permanent pasture. Infective larvae of *Ostertagia* can regain the surface of the soil after being turned in by the plough, and retain their infectivity for eight to ten months in sufficient numbers to cause severe disease.

TAYLOR, E. L. (1935). **Parasitic Gastritis : The Causes Underlying its Development in Sheep.**—*J. Minist. Agric.* **42.** 647-657. [5 refs.]

This paper gives an account, in semi-popular language, of the author's work on the epidemiology of parasitic gastritis in sheep. The factors governing the increase of parasitic worms to disease-producing numbers are considered under three headings :– (1) the productivity of the eggs of the parasite (i.e. the proportion of the parasite's eggs that reach the infective stage on the ground) ; (2) the transmissibility of the infective larvae (i.e. the proportion of the infective larvae picked up by the sheep), and (3) the susceptibility of the sheep (i.e. the proportion of infective larvae reaching the sheep's stomach that ultimately develop into mature worms). Weather conditions and agricultural practices are found to exercise an influence over the operation of these factors as follows :– the productivity of the eggs is increased by ploughing and cultivation, by folding, superabundance of herbage and (in the case of *Trichostrongylus* spp.) by prolonged drought followed by a wet period ; the transmissibility of larvae is increased by drought, or shortage of herbage for some other reason, by a large proportion of clover in the pasture, or by a high concentration of sheep ; and the susceptibility of the sheep is increased by malnutrition, as a result of drought, or from any other cause, and by a relatively low state of resistance, as would result from a large percentage of the flock being of immature age.—E. L. TAYLOR.

AUGUSTINE, D. L., & DRINKER, C. K. (1935). **The Migration of Microfilariae (*Dirofilaria immitis*) from Blood Vessels to the Lymphatics.**—*Trans. R. Soc. trop. Med. Hyg.* **29.** 303-306. 3 figs. on 2 plates. [2 refs.]

Recent work has shown [DRINKER, AUGUSTINE, & LEIGH – this *Bull.* **5.** 828.] that microfilariae of *D. immitis* readily pass through lymphatic glands, a discovery contrary to the view generally held. In the experiment here reported, 1,000 c.c. of blood from an infected dog, which had been observed to carry 340,000 microfilariae per c.c., was inoculated intravenously into an uninfected dog. In ten minutes the recipient's blood showed a count of 178,000 microfilariae per c.c. and, within an hour, 48 microfilariae per c.c. were found in the lymph collected from

the thoracic duct, showing that microfilariae readily leave the circulation and enter the lymphatic ducts.

A histological examination was subsequently made of the tissues, but no evidence was found of any cellular reaction in relation to the living microfilariae. —E. L. TAYLOR.

IMMUNITY.

WATSON, E. A. (1935). **Tuberculin, Johnin and Mallein Derived from Non-protein Media.**—*Canad. publ. Hlth J.* **26.** 268-275. 1 fig., 2 tables. [5 refs.]

A synthetic medium tuberculin prepared in a fluid which is almost identical with that advocated by DORSET [this *Bull.* **4.** 641.] has been used on many thousands of cattle tested under the tuberculosis eradication scheme of Canada with very satisfactory results. The medium yielded from 10 to 14 g. per litre dry weight of bovine tubercle bacilli and furnished a tuberculin which, when tested for potency by the guinea pig cutaneous and lethal tests or by complement-fixation in the presence of a specific anti-tuberculous serum, was at least equal in value, and was sometimes superior, to a standard Koch's " O.T." Comparative tests in cattle followed by *post-mortem* examinations have also suggested a distinct superiority in favour of synthetic medium tuberculin.

A synthetic medium johnin has also been evolved by growing the organism on the medium of Long and Seibert or on a modified Sauton's medium. The optimum reaction fell between pH 5·6 and pH 5·8. Five strains have been cultivated in this manner, two of which yielded from 12 to 14 g. dry weight per litre, and all have been acclimatized to growing without the addition of *Mycobact. phlei* or its extracts [see also DUNKIN – this *Bull.* **4.** 372].

Some preliminary experiments have also been completed on the growth of *Pfeifferella mallei* in the protein-free synthetic media used in the previous studies. The results have been most satisfactory, since mallein produced in these media has induced much smaller reactions in negative horses without any apparent loss in potency for positive animals.—R. E. GLOVER.

KUJUMGIEFF, I., & GREBENAROFF, L. (1935). La tubercolina ottenuta dal terreno di Sauton nella diagnosi della tubercolosi aviaria. [**Diagnosis of Avian Tuberculosis by Tuberculin Prepared in Sauton's Medium**].—*Profilassi.* **8.** 9-11. 1 table. [3 refs.] [English and French summaries : abst. from orig.]

A comparison was made between the ophthalmic and intradermal reactions produced by tuberculin prepared from avian bacilli grown in Sauton's medium and ordinary avian tuberculin. In the first experiment, a drop of ordinary tuberculin was instilled into the conjunctival sacs of 22 hens and two turkeys which were known to be suffering from tuberculosis. Thirty-six hours later, Sauton's tuberculin was instilled into the same eye but in no case was a subsequent reaction produced. In the second experiment, the intradermal reaction produced by the two tuberculins was compared. In this case, more pronounced reactions were obtained with Sauton's tuberculin. The authors conclude that tuberculin which contains no protein may be used in practice and that Sauton's tuberculin is superior to ordinary avian tuberculin for the intradermal test.—J. A. NICHOLSON.

VOLIK, E. K. (1935). **Standardization of Tuberculin.**—*Sovyet. Vet.* No. 3. pp. 52-54. 1 table. [Abst. from French summary].

The author considers that the method of standardization of tuberculin, by titration of its activity on guinea pigs and verification on tuberculous cattle, is not

satisfactory. Standardization based on the reaction shown by tuberculous cattle is, however, a reliable method. The degree of activity of this reagent may be considered satisfactory if a positive reaction results in tuberculous animals when a dose of 0·01 [presumably 0·01 c.c.] is introduced by the intradermal route.
—C. Davenport.

Finzi, G. (1935). " Exotuberculines " allergiques et " exotuberculines éteintes." [**Exotuberculins. (ETF)**].—*Boll. Sez. ital. Soc. int. Microbiol.* **7.** 304-310. [15 refs.] [In French].

In this article, it is stated that various investigators in France, Germany and Spain have now tested exotuberculin and that they are unanimously of the opinion that it possesses a higher degree of potency than Koch's " O.T." Finzi has also undertaken further experiments with formolinized filtrates from cultures of *Mycobact. tuberculosis* grown at 41·5° to 42°C. Such products are entirely devoid of toxic or diagnostic action, but are rich in a carbohydrate fraction which gives strong precipitin reactions with antituberculous sera. It is suggested that this atoxic preparation might be of value in the treatment of tuberculosis.—R. E. G.

I. Madsen, T. (1935). Indledende bemaerkninger om tuberkulinreaktioner. [**Introductory Remarks on Tuberculin Reactions**].—*Ugeskr. Laeg.* **97.** 191-193. 4 charts. [1 ref.]

II. Madsen, T. (1935). Oversigt over Seruminstitutets epidemiologiske tuberkuloseundersögelser. [**A Survey of the Epidemiological Investigations on Tuberculosis made in the State Serum Institute, Copenhagen**].—*Ibid.* 212-225. 28 tables, 2 charts. [1 ref.]

I. Since the introduction of the international standard tuberculin, the State Serum Institute, Copenhagen, has commenced epidemiological tuberculosis investigations on a larger scale among different groups of the population. The intracutaneous (Mantoux') test has proved to be far superior to the cutaneous (Pirquet's) and the subcutaneous (Moro's) tests. For Mantoux' test, as now used, 0·01 mg. is first given : three days later the reaction is read and, if negative, 0·1 mg. is given ; if this reaction is also negative after three days, 1 mg. is given. Of all persons yielding a positive tuberculin (Mantoux') reaction only 50 to 68 per cent. are found with 0·01 mg., 89 to 97 per cent. with 0·1 mg., and the remaining persons are only positive with 1 mg.

As regards the number of positive reactions, the same results are given with Pirquet's test as with 0·01 mg. in Mantoux' test, and Pirquet's test is, therefore, not suitable for environmental investigations, as greater accuracy is obtained with Mantoux' test. In individuals up to 12 years of age Moro's test yields useful results, whilst in older individuals it is far less sensitive than Mantoux' test.

II. The result of these examinations shows that the percentage of individuals with a positive tuberculin reaction varies considerably in different parts of the country. The reaction percentage among school children in towns is greater than in the surrounding rural districts. Districts with a low reaction percentage among the children have no, or comparatively little, bovine tuberculosis.
—H. C. Bendixen (Copenhagen).

Sánchez, L. C. (1934). La serorreacción de Vernes en el diagnóstico de la tuberculosis del ganado vacuno. [**The Serum Reaction of Vernes in the Diagnosis of Bovine Tuberculosis**].—*Rev. Hig. Sanid. pecuar.* **24.** 151-160. 4 figs., 1 table. [9 refs.]

The author examined sera from 57 bovines by the photometric method of Vernes, Bricq and Yvon, correlating the results with those of *post-mortem*

examinations. The method consists in flocculation of serum by resorcinol and measuring the absorption and diffusion of light before and after flocculation by means of Vernes' photometer. The difference is referred to as the photometric index. It was found that the samples of serum should be examined less than 24 hours after being taken and that 15 hours' starvation before sampling was necessary.

Of the 57 animals so examined, 16 were healthy, two were healthy and pregnant, 26 were in various stages of tuberculosis, and the remainder were affected with distomatosis, echinococcus infection, mastitis or pleurisy.

The average index for the tuberculous animals was 31·6, the lowest reading being 19. The indexes of the healthy animals were 7 or less, but were higher in the two pregnant animals (11 and 8 respectively). The one case of mastitis examined gave an index of 20 and the remainder varied from 7 to 15.

The author draws the tentative conclusion that indexes of 20 or over correspond with the presence of tuberculosis.—R. S. Roberts.

Neiva, C. (1934). Aglutininas para o genero *Brucella* em sôros de animais. [**Agglutinins for Brucella in the Serum of Animals**].—*Rev. Indust. anim.* **11.** 81-85. 5 tables. [4 refs.] [English summary : abst. from orig.] [Also published in *Brasil-med.* **48.** 421-424. (German summary)].

The sera tested for agglutinins for *Br. abortus* were obtained from native-bred cattle brought to São Paulo for slaughter. The results were :– 414 cattle (6·7 per cent. positive) ; 216 goats (1·6 per cent. positive) ; 218 sheep (0·48 per cent. positive), and 644 pigs (44·04 per cent. positive).

The high percentage of infected pigs detected is in accordance with previous investigation which has incriminated the porcine strain of *Br. abortus* as the cause of undulant fever in human beings in São Paulo. Attempts to isolate and identify *Br. abortus* from carcasses of reacting pigs have failed.—R. S. Roberts.

Vellisto, E. (1935). Einiges über den Milchagglutinationstiter bei der Bang-Infektion der Kühe. [**Milk Agglutination Titre in *Brucella abortus* Infection in Cows**].—*Eesti loomaarstl. Ring.* **11.** 15-23, 46-63 and 81-100. 13 tables. [62 refs.] [In German].

This paper is divided into five parts. In the first part, Vellisto concludes that, in view of the fact that no detectable brucella agglutinins filter into the milk in animals with a blood serum titre of 1 : 40 or lower, whey agglutination at 1 : 2·5 should be regarded as evidence of udder infection when the blood serum titre is not above 1 : 160.

In the second part, the author concludes that agglutination tests made with whole milk cannot be satisfactorily read below a dilution of 1 : 40. Skim milk is somewhat better. Whey is best, that obtained by rennet being preferable, though lactic or acetic acids may be used and sometimes give better whey.

The third part states that no variation of agglutinating power was noted between fore-milk, mid-milk and strippings, or in morning, mid-day or evening milkings. It is highest immediately after calving, in the colostral stage, and in a few days drops to the ordinary level where it tends to remain until drying commences, when it again rises. Good whey can be obtained from colostrum but not often from the milk of a drying cow. Whey agglutination indicates udder infection but, since blood agglutinins do not filter through, is less useful than blood for diagnosis of infection. The titre of the four quarters may vary and quarter samples are advisable.

In the fourth part, the author states that the whey titre is ordinarily lower than that of blood (2 to 130 times) but that of a nearly dry cow may be the same

or higher, whilst colostrum is similar or somewhat lower. A table is given to show the relationship of blood and whey titres, 40 per cent. of animals with a blood titre of 1 : 80 showing agglutinins at a dilution of at least 1 : 2·5 in whey, whilst 70 per cent. of whey samples from animals with a blood titre of 1 : 160 and all whey samples from animals with a blood titre of 1 : 320 or over gave a similar result, i.e. agglutination at 1 : 2·5.

In the concluding part, it is stated that demonstration of brucella in the milk by guinea pig inoculation was associated with a blood titre of at least 1 : 80 and a whey titre of at least 1 : 2·5. Cultures on plates were only obtained when the blood titre was 1 : 320 or over and the whey titre from quarter samples 1 : 40. The number of colonies obtained from 1 c.c. of milk varied from one to 250.
—A. W. Stableforth.

Diernhofer, K. (1935). Zur Technik der Frischmilchschnellagglutination. **[The Technique of the Fresh Milk Rapid Agglutination Test for Brucella Infection].**—*Dtsch. tierärztl. Wschr.* **43.** 337-339. [5 refs.]

The author refers briefly to the difficulties experienced by previous workers in elaborating a rapid technique for the detection of agglutinins in milk in cases of contagious abortion and then describes the method which he himself has evolved. The antigen, after being stained by either crystal violet or gentian violet, is washed several times by centrifugation until a firm deposit is obtained with a colourless supernatant fluid. The sediment is then added to a known quantity of saline to give a definite percentage of bacterial suspension. The milk is filtered to remove clots and any extraneous matter. It is mixed with the antigen to give a dilution of 1 : 20. The test is carried out at 40° to 50°C. The readings are made on the following basis :– if floccules form immediately with coloration of the containing fluid the result is indicated by + + +, if they form slowly, but in less than three minutes, with no intermediate coloration, by + +, and if they just appear at the end of three minutes the result is indicated by +. The construction of the capillary tubes and the preparation of the bacterial suspension are described in detail.
—N. S. Barron.

Sarnowiec, W. (1935). Développement des anticorps antibrucelliques chez les animaux traités par le BCG ou par des bacilles tuberculeux morts. **[The Development of Brucella Antibodies in Animals Inoculated with BCG or with Dead Tubercle Bacilli].**—*Ann. Inst. Pasteur.* **55.** 175-181. [9 refs.]

The author tested, after varying periods, the agglutinin content for *Br. abortus* of sera of guinea pigs inoculated with varying doses (1 mg. to 1 cg.) of BCG and subsequently inoculated intraperitoneally with 1 to 3 c.c. of a heavy suspension of live *Br. abortus* organisms. The agglutination titre for *Br. abortus* of guinea pigs inoculated with BCG was considerably lower than that of control animals. The titre was lowest in the sera of the guinea pigs that received the greatest dose of BCG.—T. M. Doyle.

Červinka, F., & Jílek, J. (1935). Příspěvek k diagnostice Brucella abortus Bang. **[Diagnosis of Bovine Contagious Abortion].**—*Zverolék. Rozpravy.* **9.** 49-56 and 61-65. 1 table. [34 refs.] [German summary : abst. from orig.]

The "rapid" agglutination test gives good results and the authors emphasize its importance. They found, by the agglutination of milk and milk serum, that in the case of udder infection all quarters of the udder do not necessarily contain agglutinins. This fact is very important in the examination of udder infection and it is necessary to test all four quarters separately. Only fresh milk or milk

serum should be tested, as within a short time there is a drop in the agglutination titre (in four days at a temperature of 8°C.). The agglutination test with whole milk is more difficult to read than that with milk serum.—E. Pribyl (Brno).

Turner, E. L., Dennis, E. W., & Berberian, D. A. (1935). **The Value of the Casoni Test in Dogs.**—*J. Parasit.* **21.** 180-182. 1 table. [10 refs.]

Intradermal inoculations of freshly prepared sheep's hydatid fluid were carried out on the inner aspect of the thighs of 61 dogs ; notes were taken of the resulting reactions, and *post-mortem* examinations subsequently carried out on the test dogs in order to make a thorough search for infestation with *Echinococcus granulosus*. No direct correlation was observed, however, between positive Casoni reactions and the presence of *E. granulosus* and it was concluded that the test is of no value as an index of intestinal infection with this parasite.—E. L. Taylor.

Ramon, G., Richou, R., & Descazeaux, J. (1935). L'antitoxine staphylococcique d'origine naturelle, chez l'homme et chez différentes espèces animales. [**Natural Staphylococcus Antitoxin in Man and Animals**].—*Rev. Immunol.* **1.** 401-414. 11 tables. [16 refs.]

The authors have demonstrated that appreciable quantities of staphylococcus antitoxin exist in normal human serum and also in normal sera of monkeys, horses, cattle, sheep, pigs, rabbits and guinea pigs. The quantity present appears to increase with the age of the animal. Immunity resulting from this antitoxin can be transferred in a passive form from mother to offspring.

The tests employed for demonstrating the presence of antitoxin in serum were the intradermal method, the haemolytic method and, when the antitoxin was present in suitable quantities, the flocculation test, the technique in each case being given

The quantities detected in the respective sera were :– human sera up to 3 international antitoxic units ; monkeys, horses and pigs up to 15 units ; cattle and sheep up to 5 units ; guinea pigs up to 10 units ; rabbits up to 2 units and dogs less than 1 unit.

The presence of such antibodies in apparently healthy animals is of great significance to those who may require to use such animals for estimations of the toxicity of staphylococcus toxin, the innocuity of anatoxin, etc., and also to those who wish to immunize such animals artificially.—Gwilym O. Davies.

Mespoulet, Lemétayer, E., & Bardot. (1935). Vaccination par l'anatoxine tétanique des juments en gestation ; immunité des jeunes. [**Immunity to Tetanus in Foals from Mares Vaccinated with Tetanus Anatoxin during Gestation**].—*Bull. Acad. vét. Fr.* **8.** 337-345. 1 table. [8 refs.]

A number of mares were vaccinated with tetanus anatoxin at the end of pregnancy. None of them showed any ill effects from the vaccination and their blood serum developed a high antitoxin titre. The immunity produced, however, was not as high as that which resulted when geldings and non-pregnant mares were vaccinated. Similarly the serum of the foals was proved to be antitoxic. [No mention of absorption of antibodies from milk]. This immunity diminished during early life and was not detected in any of the foals after the age of three months. [The authors speak of the mares having acquired sufficient immunity to be protected against puerperal tetanus, and of the foals resisting tetanus of umbilical origin, but no actual infection experiments were carried out to prove these points].—F. Blakemore.

CULBERTSON, J. T. (1935). **Antibody Production by the Rabbit against an Ectoparasite.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 1239-1240.

Culbertson examined the serum of five infested and five healthy rabbits for the presence of precipitins which might be produced against the mite *Psoroptes communis* var. *cuniculi*. The antigen was prepared by mashing and triturating about 300 mites in a mortar for ten minutes with 1·5 c.c. of Coca's solution. After centrifugation at high speed, the very slightly opalescent supernatant fluid was decanted and used as antigen. For the test 0·1 c.c. of antigen was superimposed on an equal volume of clear serum in a small bore tube. The tubes were incubated for one hour at 37°C. and read for a " ring " at the junction of the fluids. The fluids were then mixed, incubated for one hour at 37°C., placed in the cold for 24 hours and examined for precipitate. Precipitins were demonstrated in infested rabbits but no reaction occurred with serum from healthy rabbits.—J. S. STEWARD.

GORET, P. (1935). De la vaccination. [**Vaccines and Vaccination**].—*Rec. Méd. vét.* **111.** 134-152.

The author discusses the various methods of immunization and points out that the old idea, that recovery from an artificially induced slight infection is necessary for the production of immunity, does not apply in the case of a number of diseases, such as tuberculosis, epizootic abortion, and piroplasmosis.

In such diseases, the method of immunization is by premunition where immunity lasts only as long as the organisms inoculated persist in the body. Vaccination with BCG is recommended as a certain protection against tuberculosis in cattle, provided that the necessary sanitary precautions and early isolation of calves are thoroughly carried out.—NORMAN BISSET.

SHWARTZMAN, G. (1935). **The Phenomenon of Local Skin Reactivity to Bacterial Filtrates : Elicitation of Local Reactivity by way of the Vascular System.**—*J. exp. Med.* **62.** 621-644. 2 plates, 5 tables. [37 refs.]

The possibility of eliciting the Shwartzman reaction by the vascular system was tested on rabbits' ears. Bacterial filtrates were used which were highly potent by the combined intradermal plus intravenous method, but responses could not be induced by the preparatory intravenous injection of large doses. It is suggested that, under normal conditions, the capillaries do not permit the diffusion of the circulating antigen into the extravascular tissues which are, therefore, not sensitized to the second intravenous injection. Various agents such as xylol, acetylcholine, pilocarpine, histamine, etc., gave negative results. On the other hand, strong reactions were obtained when the ear was first clamped to arrest the circulation and then warmed to 50° C. for five minutes prior to the first injection, or by the injection of bacterial filtrates mixed with testicular extract.—R. E. GLOVER.

COULAUD, E. (1934). Etat allergique durable, obtenu chez les animaux de laboratoire, par injection sous-cutanée de bacilles tuberculeux morts, enrobés dans la paraffine solide. [**A State of Lasting Allergy obtained in Laboratory Animals by the Subcutaneous Injection of Tubercle Bacilli mixed with Solid Paraffin**].—*Rev. Tuberc., Paris.* October. 850-855. 3 figs. [3 refs.]

The author refers to the difficulty in securing a durable state of allergy in laboratory animals through the simple inoculation of dead tubercle bacilli. He attempted to prolong this state by injecting subcutaneously dead tubercle bacilli embedded in solid paraffin. Rabbits and guinea pigs were the animals employed. Positive reactions to tuberculin were obtained in the inoculated animals a year and more afterwards. The histological changes taking place at the site of inoculation are described.—C. DAVENPORT.

HOLTMAN, D. F. (1935). **Hypersensitivity in Rabbits Immune to the Protein of Bot-Fly Larvae.**—*J. Amer. vet. med. Ass.* **87.** 171-174. 3 tables. [4 refs.]

The object of the investigation was to determine whether anti-bot-fly larvae factors could be produced in the rabbit, and their presence demonstrated by cutaneous, ophthalmic and precipitin tests.

Three rabbits were injected intravenously with antigen prepared from horse bot-fly larvae : one of them had previously been infected with *Trichinella* and another served as a normal control. In tests carried out, the ophthalmic tests were found to be of no value but the cutaneous tests were, as a whole, very satisfactory and, as the trichinella-infected rabbit and normal control showed no reaction, it is considered to be specific. The precipitin tests proved to be quite satisfactory but the precipitins disappeared within about three weeks. The intensity of the skin reactions did not coincide with the precipitin content of the serum.—J. S. STEWARD.

DISEASES, GENERAL.

BRUCE, E. A. (1934). **Principal Diseases of Animals and their Control : A Summary.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 2995-3002.

This is a summary of papers submitted by various authors in New Zealand, New South Wales, Tasmania, Fiji, Dutch East Indies, Siam, Japan, Peru, Oregon, Washington and British Columbia, concerning the prevalence and measures of control of the principal diseases of animals in their respective countries or states. —GWILYM O. DAVIES.

EARL, W. B. (1934). **Livestock Disease Conditions.**—*Nev. State Bd. Stock Comms. Bien. Rept. 1932-1934.* pp. 11-17.

Nevada has been declared a modified accredited area and as such is nearly free from bovine tuberculosis. An accredited herd plan is also in operation with contagious bovine abortion. Bacillary haemoglobinuria [*Clostridium hemolyticum* infection] causes slight losses as do also dourine and bovine anaplasmosis. Many horses died of encephalomyelitis and a virus vaccine was issued. Swine fever gave little trouble.

The results of the work are given largely in tabular form.—F. H. MANLEY.

WIRTH, D. (1935). Sammelreferat Veterinärmedizin 1933. **[Veterinary Haematological Review for 1933].**—*Folia haemat.* **53.** 463-474. [Numerous refs.]

NORMAL PHYSIOLOGY.—RÖLICH investigated the development of lymphatic tissue and bone-marrow in new-born cats and dogs. FAIRMAN *et al* found that the bone-marrow volume in dogs was about 2 per cent. of the body weight. SCHWAYER investigated the Fonio blood coagulation normals of equine blood [technical details and results are given in figures]. BUTOZAN, LAMARRE and SERBEC worked on the normal blood picture of cattle, and ANANIADÈS on that of buffaloes. WINTROBE examined the red blood corpuscle size and haemoglobin content in several vertebrates. The blood volume : Hb ratio remained very steady.

DIAGNOSTIC TESTS.—FUGMANN tested the accuracy of the Schilling four field Mäander method of enumerating leucocytes and suggested that at least 1,000 white blood corpuscles should be counted for the purpose. OPPERMANN stated that the guttadiaphot test is valuable in showing an abnormal condition of the blood due to metabolic disorder of variable origin. SWEDIN stated that the sedimentation rate depends on the cholesterin content of the blood. ARCINIEGA suggested that the sedimentation rate of bovine blood varies during tuberculosis, MGLEJ investigated the sedimentation rate of horse blood and HARDT that of porcine blood.

Anaemia.—Numerous papers on equine infectious anaemia were published. Hjärre's work on the liver lesions of this disease is specially referred to. Gerlach investigated infectious anaemia of sheep in Turkey. Radeff investigated the blood of new-born pigs with reference to piglet anaemia. Various anaemias of an experimental nature are also reported.

Leucaemia.—Wirth and Baumann worked on the leucaemias of dogs, which they say are common : they are of the lymphatic type. A number of papers on lymphocytomatosis in cattle appeared. It is spreading alarmingly in Germany. Stubbs differentiated the leucoses of fowls into three types – erythroleucosis, myeloid leucosis and lymphoid leucosis. The first two only are infectious.

Blood Picture in Disease.—The year's literature is referred to by name of author and disease only [see orig.].

Blood Groups.—Blood groups in horses were studied by Schermer and Kaempffer and by Burghardt, those of cattle by Lodemann and those of fowls by Binder and by Kozelka.—J. E.

Walker, W. H. (1935). **An Epidemic of Coughing in Horses.**—*J. R. Army vet. Cps.* **7.** 5-7.

This paper is an account of the coughing epidemic which recently swept Great Britain, as it affected the horses of the army. It is compiled by the author partly from personal experience and partly from information supplied by numerous veterinary officers who dealt with the outbreak. The outbreak covered the months of July, August and September, 1935. Coughing was the only pronounced symptom. All army units were affected to an extent varying between 25 per cent. and 100 per cent. of their strength. There was no mortality.—C. Davenport.

Beach, J. R. (1934). **Poultry Disease : Recent Discoveries.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 2961-2968. [Numerous refs.]

The author reviews the discoveries in regard to poultry diseases between 1929 and 1933, dealing mainly with fowl pox, infectious coryza, laryngotracheitis, coccidiosis and lymphomatosis. In regard to fowl pox, the most important points mentioned are the transmission of the disease by the inoculation of a single Borrel body, the transmission of the disease by species of *Culex* and *Aedes* which remain infective for 27 days, and the use, in the United States of America, of a vaccine prepared from the combs of artificially infected cockerels. It is said that dullness and inappetence due to the inoculation can be almost entirely avoided by vaccination between the ages of 30 and 90 days. Two types of infectious coryza are said to occur in the U.S.A., one due to *Pasteurella aviseptica*, and the other due to a small Gram-negative, non-motile bacillus which will pass certain Berkefeld V filter candles. The discovery of inclusion bodies in the epithelial cells of the trachea, the neutralization of the virus *in vitro* by the serum of recovered birds, the existence of a carrier state which may persist for 16 months, and immunization by cloacal infection are the most important advances in the knowledge of infectious laryngotracheitis [this *Bull.* **3.** 249, 305, 543 and 704]. In coccidiosis, the recognition of six varieties of the parasites, and the confining of serious pathogenicity to the two species *Eimeria necatrix* and *E. tenella* were the biggest advances. Lymphomatosis (fowl paralysis) is discussed and it is considered that some evidence has been produced that the disease can be transmitted through the egg, but that the proof of this is not absolute.—U. F. Richardson.

Mercer, W. B. (1935). **Mortality in Poultry.**—*J. Minist. Agric.* **42.** 828-833.

The heavy losses which were to be expected as a result of the large increase in the poultry industry in England in recent years are commented upon. At

present only about 10 per cent. of chicks survive to their second year. The author discusses the factors which have an influence on this.—J. E.

I. Jarmai, K. (1935). Die Leukosen der Hühner. [**Avian Leucosis**].—*12th Int. vet. Congr. 1934.* **3.** 235-251. [English, French and Spanish summaries: abst. from orig. in German].

II. Stubbs, E. L. (1935). **Leukemia of Fowls.**—*Ibid.* 251-262. [22 refs.] [French, German and Spanish summaries].

I. Three types of true avian leucosis exist, *viz.* lymphatic, myeloid and erythroleucosis. Of these, the first appears to be non-infective, whilst the other two are transmissible and are apparently caused by the same agent. The differential diagnosis of the three types is noted. The causal agent of the myeloid and erythroleucosis is filtrable and is associated with the blood elements. It shows considerable resistance to adverse circumstances and retains virulence for long periods. The agent appears to be specific for fowls and it is thought probable that every class of bird has its own specific strain of disease. Study of the natural spread of either form of the disease has given rise to the opinion that it is not infectious in the true sense but is a tumoral disease possibly caused by an enzyme-like product which favours the growth of certain cells.

II. The recognition of lymphoid, myeloid and erythroleucosis is discussed. All types of fowls are susceptible to all three types, but other classes of birds are not susceptible.—E. J. Pullinger.

Fradkina, R. V. (1935). **Pneumo-Enteritis, Paratyphoid Infection and Septic Diseases of New-Born Calves.**—*Sovyet. Vet.* No. 1. pp. 17-36. 5 tables. [Abst. from French summary].

This paper is a study of the diseases peculiar to new-born calves. The author shows that numerous organisms are concerned in these conditions, notably *Salmonella enteritidis* and *Proteus vulgaris*. He disagrees with the present nomenclature, *viz.* " white scour ", pneumo-enteritis, etc., and points out that diarrhoea is a symptom common to all of them. He finds that the digestive tube is penetrated, often without damage, by the organisms normally present within it, which subsequently may or may not be the cause of various severe and fatal septic conditions. The chief factors favouring development of such sequelae are umbilical infection, malnutrition and unhygienic surroundings.

The author finds that colostrum has special opsonic and bacteriolytic properties against the ordinary bacteria of the digestive tract, but that these properties weaken rapidly during the 12 hours following calving. They are at their highest two to three hours after the calf is born. He further finds that these properties vary with individual cows.

Following vaccination with suitable organisms, calves rapidly develop a considerable degree of immunity. The vaccination of in-calf cows, however, proved indecisive. Serum therapy is said to have given promising results. The paper concludes by drawing attention to the need for stricter observance of hygienic principles.—C. Davenport.

Gottardi, G. (1935). Malattie da carenza nelle bovine de latte (Ematuria cronica). [**Chronic Haematuria in Cattle**].—*Profilassi.* **8.** 25-26. [7 refs.]

The author discusses the disease, the details being similar to those observed in other countries. A study of several outbreaks has shown that it occurs most frequently in areas deficient in calcium and which have an acid soil lacking in essential minerals. Gottardi suggests that the cumulative effect of these pasture conditions is the cause of the disease. Chemical examinations of the blood of

affected animals have shown that there is a diminution in the calcium and phosphorus content of the blood, and the author claims that calcium therapy together with an abundance of good food and water quickly restore an affected animal to its former health.—J. A. NICHOLSON.

KATZKE. (1935). Die fetale Leukämie des Rindes. [**Foetal Leucaemia in Cattle**]. —*Z. InfektKr. Haustiere.* **47.** 161-165. [1 ref.]

The author studied leucaemia in cattle for many years without seeing a case in a foetus, but several cases have now come to light. The first was observed in a three-month-old foetus, obtained from a cow which had been killed on account of leucaemia. The enlarged uterus showed leucaemic changes and, on the right flank of the foetus, a round, circumscribed, white nodule was clearly visible. On cutting through the skin, the tumour was found to be embedded in the subcutis ; it was glistening white in colour and 0·1 cm. thick and, on section, it proved itself to be a typical example of a " leucoma ". The internal organs showed no leucaemic changes. In the four years which have passed since the discovery of the first case, the author has observed more or less wide-spread leucaemic changes in every foetus obtained from cows suffering from leucaemia when they were killed.—J. A. NICHOLSON.

LÁSZLÓ, P. (1935). Weitere Beiträge zur vergleichenden pathologischen Anatomie der Zirbel. [**Comparative Pathology of the Pineal Body**].—*Dtsch. tierärztl. Wschr.* **43.** 245-247. [1 ref.]

In addition to observations on the pineal body of horses [this *Bull.* **5.** 514.] this organ from 1,223 pigs and 100 cattle has also been examined. In the pig, cystic changes were found in 4·7 per cent. of cases ; the nature of such cysts is described in detail. Tuberculosis of the organ and of its membraneous covering was noted. Brain " sand " was commonly found in the pineal body of cattle and a rather unusual type of eosinophile cell was also seen. Increase of connective tissue was encountered in one case, venous congestion was rare and in only one instance was perivascular infiltration seen. Cysts were found in 3 per cent. of cases.—E. J. PULLINGER.

GENISSET, R. (1935). Les troubles nerveux du porcelet. [**Nervous Diseases of the Piglet**].—*Thesis for Docteur vétérinaire, Lyons.* pp. 69. [35 refs.]

Nervous disorders in young pigs are either acute or chronic. The acute form usually occurs just before the pig commences to feed, and is characterized by jerky breathing due to muscular spasms of the throat, and jerky movements of the limbs. The spasms increase in severity and last about five minutes, the animal falling on to its side. Recovery takes place in a few minutes. In chronic cases the spasms consist of muscular tremors, which persist for a longer period than in the acute form.

Predisposing factors are said to include age, breed and hygienic conditions. The direct cause is believed to be a hypocalcaemia. This is based on the fact that nervous disorders predispose to, and co-exist with, rickets, but no biochemical evidence is given.—N. H. BROOKSBANK.

BENNETTS, H. W. (1935). **The Prophylaxis of Enzootic Ataxia of Lambs in Western Australia.**—*J. Coun. sci. industr. Res. Aust.* **8.** 61-70. 3 tables. [11 refs.]

Bennetts previously described the epizoology and the clinical and pathological features of this ataxic condition affecting lambs in certain districts of Western Australia [see this *Bull.* **3.** 724 and **4.** 535]. The cause of the disease has not

been determined, but the author advances the hypothesis that it is a lead intoxication. The clinical and pathological features suggested this and a certain amount of chemical evidence supporting it has been obtained. It is postulated that the high calcium intake of ewes on affected pastures may lead to the storing of traces of lead in their bones and later, when lactation lowers the calcium balance, the lead may be excreted in the milk. This hypothesis prompted the author to test out ammonium chloride, which is a de-leading agent, as a prophylactic for ataxia. In three field experiments, the administration of ammonium chloride to ewes during gestation led to a considerable decrease in the incidence of ataxia and greatly enhanced the general development of the surviving lambs. The success of the ammonium chloride medication cannot yet be explained, but it is taken as further evidence in support of the lead hypothesis.—W. I. B. Beveridge.

McLennan, G. C. (1935). **Fowl Paralysis. " Range Paralysis " :** *Neurolymphomatosis Gallinarum.*—*Aust. vet. J.* **11.** 42-62. 4 figs., 1 table. [35 refs.]

This article commences with a rather extensive review of the literature on fowl paralysis and then passes on to a description of the epidemiology and clinical and pathological features of the disease as encountered in South Australia. The disease is not very prevalent in Australia and occurs irregularly, sometimes apparently without relation to other outbreaks. Weakness of one or both legs is the first symptom observed and this is soon followed by gasping. Paralysis progresses and death may follow in a few days, but may be delayed in chronic cases for three months. On *post-mortem* examination no constant macroscopic lesion was found, but in some cases there was definite enlargement of the sciatic nerves and dorsal root ganglia. Microscopically, the sciatic nerves showed infiltration with small and large mononuclear cells and a varying degree of oedema. The marked degeneration of nerve fibres recorded by other workers was not observed, though in some cases there was a suggestion of minor degenerative changes. The posterior root ganglia and spinal cord showed respectively infiltration and perivascular accumulation of the same type of cells as seen in peripheral nerves. Nervous tissue from normal fowls showed none of these features. The author could culture no bacteria from lesions, and coccidia and helminths were usually absent.

Experiments were carried out attempting to transmit the disease by inoculating emulsions of material from lesions into fertile eggs and into the chorio-allantoic membrane of ten-day-old chick embryos, which were then hatched out and the chickens reared ; inoculations were also made intracerebrally into day-old chicks. Except possibly for one instance, the disease could not be reproduced.—

—W. I. B. Beveridge.

Magnusson, H. (1935). Hönsparalysi. En för vårt land ny och ekonomiskt viktig sjukdom. [**Fowl Paralysis in Sweden (Including General Review)**]. —*Svensk VetTidskr.* **40.** 43-68. 5 figs. [20 refs.]

Fowl paralysis was recognized for the first time by the author in Sweden in 1929, amongst a batch of cockerels imported from the United States of America. Since then it has been found to exist on several farms and now threatens to become a real pest to poultry farming, as in many other countries. The disease has not yet been reported from Denmark. The chief part of the article contains the author's own observations on the outbreaks in Sweden and a general description of the disease.—Gustav Naerland (Farsund).

Engelbreth-Holm, J., & Meyer, A. R. (1935). **On the Connection between Erythroblastosis (Haemocytoblastosis), Myelosis and Sarcoma in Chicken.** —*Acta path. microbiol. scand.* **12.** 352-365. 2 tables. [12 refs.] [In English].

This is a renewed consideration of the relationship between erythroblastosis (haemocytoblastosis), myelosis, sarcoma and mixed cases.

In the passage of any one strain, different types of the disease appear and it is assumed that all such types are produced by the same agent. In explanation of the changes which occur, the authors state that the behaviour of the strain depends upon the predisposition of the bird to a particular type of disease. It is also claimed that the method of inoculation is an important factor, and also the particular cells attacked, whether they be immature, e.g. haemohistioblasts, capable of giving rise to a variety of forms, or more mature as in the case of the haemocytoblasts, which can only give rise to leucosis.

In conclusion the authors state :—

" we consider the agent itself as a product of the attacked cells that can be reproduced only by the living cell. When introduced into a normal organism, the agent can induce tumor properties in the same kind of cells as the one from which it originated, and make these cells reproduce new agent.

" These agents appear to occupy an exceptional position in the great group ' ultravisible virus ', and they are possibly to be regarded as representatives of a rather independent group of producers of disease, a group that has not received much attention hitherto, which might be called ' endogenous ' agents ".

—Gwilym O. Davies.

Quin, J. I., Rimington, C., & Roets, G. C. S. (1935). **Studies on the Photosensitisation of Animals in South Africa. VIII. The Biological Formation of Phylloerythrin in the Digestive Tracts of Various Domesticated Animals.** —*Onderstepoort J. vet. Sci.* **4.** 463-478. 9 figs., 1 table. [11 refs.] [For abst. of previous article of this series, see this *Bull.* **5.** 525].

In these experiments, studies were made on ruminants, horses, rabbits, guinea pigs, swine, rats, dogs and fowls. In order to study the production of phylloerythrin, the action of digestive enzymes from the saliva and the effects of plant enzymes, bacterial flora, infusoria, etc. in the rumen had to be considered. The authors arrived at the conclusion that the infusoria and bacterial flora were probably the agencies responsible for the production of phylloerythrin. It is not present in the plant, but arises in the course of digestion and can be produced from any chlorophyll-containing plant. It could only be demonstrated when there was an abundant microbial flora.—E. M. Robinson.

Götze, R. (1935). Koma, Lähmung und Krampfe während der Mutterschaft und der Laktation (Milchfieber). [**Coma, Paralysis and Tetany during Parturition and Lactation (Milk Fever)**].—*12th Int. vet. Congr. 1934.* **2.** 348-366. 1 table. [English, French and Spanish summaries : abst. from orig. in German].

The symptomatology of milk fever and associated conditions is discussed ; the basic symptoms are those of coma, paralysis and convulsions. Typical milk fever is generally associated with a relaxed paralysis and paresis, and must be differentiated from the tetanic conditions known variously as grass tetany, transit tetany, etc., as well as from lactation tetany. The differentiation of these conditions can generally be effected by a careful study of the symptoms combined with a consideration of the anamnesis of the case. The author indicates briefly the possible causes of these various conditions which probably result from a disturbance of metabolic activity where the normal physiological functions have been deranged by an incorrect diet. Therapeutic measures are discussed and in this connexion the combination of udder inflation and calcium therapy for cases of milk fever is advocated. However, the author places more importance upon the discovery of the manner in which modern feeding methods fall short of the requirements of dairy cattle. The natural food of cattle, namely good hay grown on soil having

an adequate mineral content, contains a ratio of minerals together with organic food matter and roughage, which cannot be replaced by concentrated diets. [Considerable research has recently been carried out upon the biochemical aspects of the above diseases. Attention has been paid not only to mineral imbalance, but also to the question of carbohydrate deficiency. Some of this work has been dealt with – this *Bull.* **5.** 580].

In the course of the discussion, GREIG dealt with the development of hypocalcaemia as a result of the drain of calcium due to the sudden onset of heavy lactation, following a period of pregnancy when the parathyroid glands were probably in a quiescent state. In connexion with the subject of prophylactic and curative therapy, he referred to the fact that calcium gluconate is much more soluble in boric acid solutions, that such solutions are stable and that the boric acid assists absorption of the calcium after injection. These facts considerably simplify the problems associated with the injection of calcium salts.

According to WRIGHT, cases of milk fever which do not respond to calcium therapy do not respond to the inflation of the udder, and calcium therapy alone should in every case be the more hopeful treatment to apply.—E. J. PULLINGER.

SEIFRIED, O. (1935). Epithelerneuerung bei A-Avitaminose nach Zufuhr von Vitamin A. **[The Reformation of Epithelium in Avitaminosis A after Dosage with Vitamin A].**—*Arch. wiss. prakt. Tierheilk.* **69.** 250-263. 5 figs., 1 table. [4 refs.]

In order to study the retrogressive changes produced in avitaminosis A, 12 hens were fed on a vitamin A-free diet for 26 to 91 days ; some were killed and the remainder were given a vitamin A-rich diet and the process of repair was then studied. The effects of a vitamin A-deficient diet were first observed in about 23 days and were indicated by a loss of weight. On histological examination, the epithelium of the mouth, conjunctiva and the mucous glands of the upper part of the respiratory and digestive tracts was seen to be undergoing a cornifying process until, finally, cornification was complete. The changes were very similar to those seen in the vagina of rodents during the oestrous cycle. On giving an adequate supply of vitamin A, the cornifying process was arrested and repair set in seven to 91 days later. The changes here consisted in degeneration and liquefaction of the cornified epithelial layers and the formation of normal epithelium which, morphologically and functionally, resembled that which had previously been destroyed. The new epithelium developed without cell division and repair was possible owing to the fact that the underlying cells in these areas had remained unaffected. The degeneration of the upper cell layers was due to a withdrawal of food and, during the process of repair, large numbers of leucocytes collected at these points, presumably to remove the cell debris. The anti-infectious property of vitamin A is probably due to its power of instituting the repair of damaged epithelium and thus the local defence of the tissues is re-established.—J. A. N.

LOPEZ, C., & STEINER, A. (1935). Les avitaminoses A et B chez les oiseaux. **[Avitaminosis A and B in Fowls].**—*Bull. Off. internat. Epiz.* **10.** 336.

From a wide experience the authors describe the lesions of avitaminosis A and B in fowls.

In avitaminosis A there are constantly small nodules in the oesophagus, the caeca are distended with hard dry masses of food, the kidneys have a red and white reticulated surface appearance and there are urate deposits on the apices of the heart, lungs and liver. Sometimes there is also observed inflammation of the infra-orbital sinus, blindness, enlarged gall-bladder, congestion and petechiae of the intestine, distended ureters and deposits of urates on the peritoneum.

Avitaminosis B is less easy to identify: it is characterized by locomotor disturbances, anorexia, convulsions, etc. Dietary analysis is necessary for diagnosis. —J. E.

Turner, A. W., Kelley, R. B., & Dann, A. T. (1935). **Peg-leg of Cattle in North Queensland.**—*J. Coun. sci. industr. Res. Aust.* **8.** 120-132. 4 figs., 1 table. [3 refs.]

" Peg-leg ", as the disease is called locally, affects cattle only, and its incidence is limited to certain areas of North Queensland. It is characterized by underdevelopment, lameness, various skeletal deformities and relative infertility, and is most common in pregnant and lactating females during dry seasons. Histological examination of bones of affected animals showed osteoporosis and osteomalacia, and blood analysis revealed low inorganic phosphorus values. Analyses of the soils from affected areas showed them to be extremely deficient in phosphorus. The disease is considered to be essentially an aphosphorosis.

In a preliminary experiment, the dosing of dicalcic phosphate and the administration of disodium phosphate in drinking water produced very significant increases in body weight as compared with controls. However, in those animals which calved during the experiment, the dose given – 1·1 to 3 oz. dicalcic phosphate or 3 oz. disodium phosphate every second day – was not sufficient to produce this effect.

[The graphs illustrating these experiments have been incorrectly arranged over the captions, e.g. that which appears as Fig. IV should be Fig. I].—W. I. B. B.

Marston, H. R. (1935). **Problems Associated with " Coast Disease " in South Australia.**—*J. Coun. sci. industr. Res. Aust.* **8.** 111-116. [23 refs.]

This is a general outline of the progress of investigations into " coast disease ", a wasting disease affecting sheep and cattle in certain coastal districts of South Australia [see this *Bull.* **4.** 265]. The disease bears certain resemblances to wasting diseases in other parts of the world, notably " pine " in Scotland and " enzootic marasmus " in Western Australia; it is cured by transferring the animals to pastures in " sound " country. The soil of affected areas consists principally of blown shell sand, whereas the " sound " areas are ironstone country. Massive doses of iron did not effect a cure, neither did manganese, arsenic nor copper, but minute doses of cobalt exerted a markedly beneficial effect. These investigations, however, are not yet completed.

An ataxia of unknown aetiology also affects lambs on some of the same areas, but it is not thought to have a common origin with " coast disease ". [See also Lines, E. W. – p. 268].—W. I. B. Beveridge.

Marcq, J., & Devuyst, A. (1935). Dystrophie osseuse chez des poussins, par déséquilibre du rapport Ca/P dans les rations. [**Osseous Dystrophy in Fowls Caused by Unbalanced Calcium-Phosphorus Ratio in the Diet**].—*Bull. Acad. Méd. Belg.* **15.** 19-40. 4 figs. [17 refs.]

Twenty Leghorn chickens, 22 days old, were fed on a balanced ration which was quite suitable for growth when the chickens were raised out of doors or when green foodstuffs were added. In the absence of green foods, the animals rapidly developed symptoms of rickets and *post-mortem* examination confirmed this condition.

The Ca/P ratio of the foregoing feed was 1·97 : 1 and, on further investigation, it was found that, by adjusting this ratio so as to approximate to a figure of 3 : 1, a ration was obtained which prevented the occurrence of the osseous dystrophies. The authors conclude that the condition was due to a phosphorus-calcium disequili-

brium in the ration ; the defects in bone formation were the greater as the Ca/P ratio was less, and they consider that, in a suitable ration, the latter should be equal to 3 and not equal to unity as has been recommended by other investigators.
—J. R. Greig.

van Manen, E. (1934). **The Control of Cannibalism in Chicks by the Use of Ruby-Red Glass in Brooder Houses.**—*J. S. Afr. vet. med. Ass.* **5.** 245-252. 4 figs., 4 tables.

This paper describes a very effective method of preventing cannibalism in chicks, a vice usually engendered by overcrowding. The ruby-red glass which is used produces a soft red light which keeps the chicks subdued and prevents them from noticing the presence of blood on the bodies or vents of other chicks. A temporary substitute for ruby-red glass can be made by painting ordinary window panes with eosin, shellac and alcohol.—E. M. Robinson.

PUBLIC HEALTH.

Young, T. D. (1935). **The Work of Veterinary Officers, with Special References to the Production and Inspection of Imported Meat Foods.**—*Vet. Rec.* **15.** 1139-1154. 2 tables.

The author points out that the work of the food inspector has increased in this country, due to meat marketing and the Merchandise Marks Acts. The veterinary officer is connected with food from the time animals are born, in regard to the breeding, feeding and rearing.

In Great Britain, proper meat inspection is lacking except in the large cities. In connexion with the food value of home and imported meat, in tables given, it is pointed out that, as a result of analysis, there is very little difference between the best home-killed and the best Argentine chilled meat. He also shows that in imported frozen beef, after long storage up to 18 years, the difference in the nutritive products is inappreciable.

The author suggests that more refresher courses on meat and milk inspection should be given at the veterinary colleges, for those engaged on public health work.
—Brennan DeVine.

Dolan, P. F. (1935). **The Position of the Veterinary Surgeon in the Control of Milk, with Special Reference to Communicable Diseases.**—*Vet. Rec.* **15.** 1053-1067. 2 tables.

The author stresses the necessity of self-contained herds in which the numerical strength is maintained by rearing home-bred heifer calves. The advantages gained from this are :– (1) complete freedom from the losses due to tuberculosis – losses that the farmer does not recognize ; (2) no losses from bovine contagious abortion ; (3) the building up of a good-yielding herd becomes simpler following the removal of the obstacles of tuberculosis and abortion ; (4) the herd becomes more valuable and the heifer calves will command a higher price, and (5) if combined with the production of milk of a low bacterial content, an increased price is obtained for the milk.

The outstanding problem in connexion with milk is the elimination of tubercle bacilli. The theory that tubercle bacilli in milk cause immunity in human beings is a supposition and is based on weak grounds ; it is one of the causes of the delay in the eradication of this disease from milking herds. If newly purchased animals are to be added to a herd they should be kept in isolation for a period of six months and retested before being added to the herd.

It is necessary for the owners to realize that tuberculosis is a highly infectious disease. A common fault on farms is the lack of proper methods of preventing infection from outside. Herds should be tested every six months and the reactors removed. The agglutination test should be employed in connexion with bovine contagious abortion. The adoption of the self-contained herd system is the most certain method of eliminating the disease.

Mastitis should be dealt with as an infectious disease and strict measures adopted with affected animals.

Attention should be paid to drainage, not only of liquid manure from the sheds, but of the water from the cooler and washings from the dairy. The building should be properly constructed so as to facilitate easy cleaning. Lighting, adequate ventilation, sufficient cubic capacity per cow and cleanliness of utensils are essential. The author is in favour of milking by machinery ; he also favours the pasteurization of milk to be sold in bottles.—Brennan DeVine.

—. (1935). **Elimination of Milk-Borne Disease.**—*Med. J. Aust.* June 1st. 690-691. [1 ref.]

This is an editorial comment on Davison's article [see this *Bull.* **5.** 650.] on milk-borne diseases, with special reference to gastro-intestinal disturbances in infants and the use of lactic acid milk for combating these. The case for lactic acid milk is outlined, but Davison's earnest advocation of this preparation is not accepted without reservations ; it is pointed out that the vogue for lactic acid, as produced by various organisms, comes in cycles.—W. I. B. Beveridge.

Australia. (1935). **Report of the Sub-Committee on Meat Inspection.**—*Aust. vet. J.* **11.** 116-117.

The Australian Veterinary Association's Sub-committee reports that meat inspection in Australia is in a chaotic condition. There is no uniformity of control or method and it is only carried out with any degree of efficiency in the larger centres.—W. I. B. Beveridge.

Mejlbo, E. (1935). Om kødforgiftninger og bakteriologisk kødkontrol. [**Meat Poisoning and Bacteriological Meat (Control) Inspection**].—*Medlemsbl. danske Dyrlaegeforen.* **18.** 435-449 and 455-462. [25 refs.]

An outline is given of the views concerning meat-poisoning from the time of Bollinger to the present time. Meat poisoning seems to be much more rare in Denmark than in many other countries. Bacteria belonging to the enteritis group are occasionally met with. In the author's opinion, the essential aim of bacteriological meat inspection is to show whether bacteria of any kind are present in muscles and organs or not, so that the consumer can be guaranteed that meat is free from dangerous bacteria and that it will keep well. In the second place the identity of the specific infection must be determined when present. The author suggests a scheme for the bacteriological examination of carcasses. From carcasses showing evidence of meat-poisoning or other bacterial conditions it is advisable to send in for examination a fascia-covered muscle (M. extensor carpi radialis), one or two lymph nodes (superficial cervical and popliteal, or, in swine, the superficial inguinal), the spleen and a kidney. The action taken should be based on the following rules :– (1) growth of meat-poisoning or other organisms from every organ – confiscation ; (2) growth of meat-poisoning organisms from any one organ – confiscation ; (3) growth of non-meat-poisoning organisms from muscles or a lymph gland – confiscation ; (4) growth of non-meat-poisoning organisms from the kidney and/or spleen of a young animal – confiscation ; (5) growth of non-meat-poisoning organisms from the kidney and/or spleen in animals slaughtered

in other places and where the organs are sent in for examination – pass for consumption, and (6) no growth from any organ – pass for consumption.
—H. C. Bendixen (Copenhagen).

McIlwaine, J. E. (1935). **Some Causes of Rejection of Pig Carcasses.**—*N.Z. J. Agric.* **51.** 209-214.

This paper, given as a lecture to a Pig Recording Club, points out to the pig-owner the many reasons for rejection of pigs for export overseas.

The three main causes are tuberculosis, necrotic ulceration due to *Actinomyces necrophorus* or spirochaetes, and pleurisy. Pleurisy is the commonest cause, and pasteurella the most usual causative organism. The author points out the necessity for greater attention to better housing and feeding of pigs, in order to prevent lung trouble.—C. S. M. Hopkirk.

THERAPEUTICS.

Heck, J. H. (1935). Preventieve behandeling tegen surra bij paarden, in 1934 toegepast in de onderafdeeling Masamba, afdeeling Loewoe, Celebes en Onderhoorigheden. [**Drug Prophylaxis of Equine Surra in Celebes, Dutch East Indies, in 1934**].—*Ned.-ind. Bl. Diergeneesk.* **47.** 197-201.

The author records favourable results in the preventive treatment of surra in horses in Celebes with a single 1 g. dose of " naganol ". Over 500 horses so treated remained well for an observation period of six months in an infected area.
—J. E.

Schlossberger, H., & Schüffner, R. (1934). **Drug-Resistance Experiments with Arsenopyridine Derivatives on Trypanosomes.**—*J. Chemother.* **11.** 81-92. 2 tables. [25 refs.] [A German version appeared in *Z. angew. Chem.* **47.** 768-771].

This article records experiments undertaken to ascertain the relationship between arsenopyridine compounds and derivatives of phenylarsonic acid, as regards their points of attachment to trypanosome cells. The experiments were made on mice infected with three strains of *Tryp. brucei*, a normal strain, a strain resistant to tryparsamide (derivative of phenylarsonic acid) and a strain resistant to BR1 (arsenopyridine compound). Mice were infected intraperitoneally and on the next day were treated intravenously with gradually decreasing doses of the preparations under investigation, the number of trypanosomes in the blood of the animals under treatment, and of the controls, being counted daily. The strain rendered resistant to BR1 could not be appreciably influenced by other arsenopyridine derivatives nor by " tryparsamide ", " trypaflavine " or " fouadin " (a complex arsenical catechol-di-sulphonate salt). On the other hand, the strain resistant to " tryparsamide " proved sensitive to BR1, BR23 and " fouadin ". Arsenophenylglycin and tartar emetic exerted less effect on the resistant strains than on the normal one, but the arseno-antimony compound Sdt355 proved to be of the same value with all the strains. Both the resistant strains were somewhat more affected by " germanin " than was the normal strain. It is concluded that the arsenopyridine preparations BR1 and BR23 possess affinities to the protoplasm of trypanosomes which " tryparsamide " and other derivatives of phenylarsonic acid do not possess, but the anchoring points of arsenopyridine compounds must partly differ from those of arsenophenylglycin. In terms of Ehrlich's chemoceptor theory, the two arsenopyridines possess " secondary haptophors " just as arsenophenylglycin does, but their haptophors are different from those of arsenophenylglycin.—U. F. Richardson.

Bennett, S. C. J. (1935). **Equine Cutaneous Leishmaniasis : Treatment with Berberine Sulphate.**—*J. comp. Path.* **48.** 241-243. 2 figs. on 1 plate. [2 refs.]

The author records observations on a case of equine cutaneous leishmaniasis in the Sudan, due to an organism which was morphologically indistinguishable from *Leishmania tropica* of man. The lesion consisted of an ulcerating sore, about 3·5 cm. in diameter, with raised edges and a granulating centre, leishmanial bodies being plentiful in scrapings from the granulating tissue. Treatment, by the injection of 4 c.c. of a 1 per cent. solution of berberine sulphate through seven or eight evenly spaced punctures round the edge of the sore, was successful in causing healing in five weeks, but caused the formation of a large oedematous swelling which persisted up to the time of the healing of the sore.—U. F. Richardson.

Carmichael, J. (1935). **A Note on the Treatment of Canine Babesiasis.**—*Vet. J.* **91.** 449-450. [3 refs.]

The author recommends the use of " acaprin " in the treatment of canine infection with *Babesia canis*, and records that he has treated 24 cases, in all of which a marked improvement occurred after 24 hours, followed by uninterrupted recovery. The dose used was 0·02 c.c. of a 5 per cent. solution per kg. body weight, the average dose over the 24 cases being 0·2 c.c. This dose of the 5 per cent. solution was diluted with sterile normal saline to make a total quantity of 1 c.c. which was administered intravenously.—U. F. Richardson.

Gordon, H. McL. (1935). **A Note on the Treatment of Tapeworm (*Moniezia* spp.) Infestation of Sheep.**—*J. Coun. sci. industr. Res. Aust.* **8.** 21-24. 2 tables. [3 refs.]

In testing the efficiency of arsenic trisulphide against *Oesophagostomum columbianum*, evidence of efficiency against *Moniezia* spp. was found. The drug was then specifically tested against this parasite and gave evidence of high efficiency. As great an efficiency was obtained when the drug was administered in powder form as when given in combination with copper sulphate solution.—I. C. Ross.

Schmidt. (1935). Ein Beitrag zur Frage der Behandlung der Sommerwunden des Pferdes. **[The Treatment of " Summer Sores " in Horses].**—*Z. Veterinärk.* **47.** 189-201. [50 refs.]

" Summer sores ", caused by habronema larvae, are a source of considerable annoyance among army horses and Schmidt carried out trials with two therapeutic measures. Thirty cases were treated, 12 by freezing with ethyl chloride and 18 by carbon dioxide baths (fumigations). Ethyl chloride was sprayed on to the lesions until they became covered with ice and small knobs of ice appeared on the surrounding hairs. The scab which subsequently formed was removed along with any unhealthy granulations. The carbon dioxide fumigation was carried out by means of a rubber " stocking " enclosing the lower part of the limbs, up to the knee or hock, unhealthy granulations first having been removed and the leg moistened with warm water. Carbon dioxide was then pumped in and left in contact for 30 to 40 minutes. In neither of these treatments were the beneficial results very marked, and the application of tincture of iodine or rivanol ointment was found to be necessary to complete the cure which was effected in two and a half to nine weeks. Schmidt reviews the literature on the subject and is of the opinion that the aetiology is not yet clear.—E. L. Taylor.

Ross, I. C., & Gordon, H. McL. (1935). **The Effect of Starvation on the Anthelmintic Efficiency of Sodium Arsenite and Tetrachlorethylene.**—*Aust. vet. J.* **11.** 106-109. 2 tables. [1 ref.]

Following a previous experiment [this *Bull.* **5.** 850.] in which prior starvation had no effect on the efficiency of copper sulphate and carbon tetrachloride, the writers carried out similar tests with sodium arsenite and tetrachlorethylene on lambs carrying an almost pure artificial infection with *Haemonchus contortus*. Not only was there no difference between the starved and unstarved groups, but the efficiency throughout was extraordinarily low, the suggestion being that in most cases the drugs fail to enter the abomasum direct.

McEwen, A. D. (1935). **The Control of Parasitic Gastritis and Enteritis in Sheep by Treatment with Copper Sulphate and Nicotine Sulphate.**—*J. comp. Path.* **48.** 218-235. 3 tables, 3 charts, 2 photographs. [7 refs.]

Eighty lambs were kept between June, 1934, and April, 1935, on Romney Marsh, where local farmers expect high mortality from nematode infestations. About half of these were treated with doses varying from 5 to 20 c.c. of a mixture consisting of 5 g. of copper sulphate and 5 c.c. of a solution containing 40 per cent. nicotine sulphate in every 100 c.c. of water, most of the sheep being given three doses during a period of six weeks ; the remainder were intended to be untreated controls : this was the case for six months, but on account of deaths these were subdivided into three groups from December 15th onwards, receiving respectively nicotine sulphate alone, copper sulphate alone and no treatment.

The lambs treated with the copper sulphate and nicotine sulphate mixture gained in weight steadily through the winter, except for a period between December 15th and January 12th, when arrest of their gain may have been due to the pasture having been grazed bare ; the third untreated group of the original controls lost weight steadily through the winter and sold in the market for less than half the sum fetched by the treated lambs. The more serious effects of nematode infestation of lambs on permanent pasture in this country may, therefore, be prevented by this mixture.

Nicotine sulphate alone seemed to be more effective than copper sulphate alone ; the reason why the mixture of the two is effective may be that the copper sulphate, as Ross showed, stimulates the function of the oesophageal groove, so that the nicotine goes straight to the abomasum and the intestine.

Post-mortem examinations and worm counts showed that some lambs carried 20 to 30 thousand worms. Of these, *Trichostrongylus vitrinus* was regularly the commonest species in the intestine and *Ostertagia circumcincta* and *O. trifurcata* in the abomasum. Only seven *Haemonchus contortus* were found, only one lamb being infested. *Dictyocaulus filaria* was often present in considerable numbers in the lungs or bronchi in both treated and untreated lambs, so that this species cannot have caused the retardation of growth and unthriftiness of the untreated lambs, and treatment of lungworms appears to be unnecessary if the intestinal worms are effectively treated. Diarrhoea, if profuse, is usually a symptom of enteritis rather than of gastritis, the former being more severe than the latter in these cases.

An appendix gives details of the worm counts and *post-mortem* findings.

—G. Lapage.

Gordon, H. McL. (1935). **Efficiency of Certain Drugs against *Haemonchus contortus*. With a Note on the Treatment of Trichostrongylosis.**—*Aust. vet. J.* **11.** 109-113. 3 tables. [4 refs.]

Having in a previous experiment obtained very variable and low average efficiency against *H. contortus* with both sodium arsenite and tetrachlorethylene, the writer conducted a carefully controlled experiment in which the drugs were administered to artificially infected lambs four months old in much higher dose rates than those usually recommended. The previous results were confirmed.

In a second experiment the drugs administered to similar lambs were :– (1) sodium arsenite (50 mg.) in combination with 200 mg. copper sulphate in 10 ml. water ; (2) carbon tetrachloride (1 ml. in 4 ml. liquid paraffin), and (3) carbon tetrachloride (2 ml. in 3 ml. liquid paraffin). The sodium arsenite in this case gave an average efficiency of 99·9 per cent. against all worms, the 1 ml. dose of carbon tetrachloride 90·9 per cent. and the 2 ml. 99·8 per cent. The increased efficiency of sodium arsenite in combination is considered to be due to the closing of the oesophageal groove by the copper sulphate, the drug then passing direct to the abomasum. When administered alone, it may enter the rumen. The variation in efficiency of tetrachlorethylene is probably due to the same factor.

Tests were also made of a number of drugs against *Trichostrongylus* spp., the most effective and safe being a mixture of copper sulphate and " blackleaf 40 " [a proprietary remedy containing 40 per cent. nicotine sulphate]. A solution containing 1 lb. copper sulphate and 16 fluid oz. " blackleaf 40 " in 5 gallons of water is recommended for trial, the dose rate being 2 oz. for adult sheep, one and a half ounces for yearling lambs, 1 oz. for lambs 4 to 12 months old, and half an ounce for lambs under 4 months.

Orloff, I. W. (1935). Le traitement de la dictyocaulose des moutons et des veaux par la méthode des injections intratrachéales en U.R.S.S. [**Treatment of Dictyocaulus Infestation of Sheep and Calves by Intratracheal Injections in the Union of Socialist Soviet Republics**].—*Bull. Acad. vét. Fr.* **8.** 390-401. [25 refs.]

The success of intratracheal injections for the treatment of husk in sheep and cattle is dependent largely upon the position of the animal at the time the injection is made. Orloff has found that the medicament is much more likely to find its way to the place where the worms are situated if the animal is maintained on its back, leaning a little to one side, and then to the other side as the injection is made. A special kind of bench is used for maintaining the animal in the desired positions. A solution of 1 c.c. of 10 per cent. " tincture " of iodine and 50 c.c. of glycerin in 150 c.c. of distilled water was used, the dose for sheep being 10 c.c. and for young cattle 20 to 50 c.c. Experience in the field has shown this method to be very effective where pure dictyocaulus infection is concerned, but less so where the condition is complicated (in sheep) by the presence of synthetocaulus.—E. L. T.

Domagk, G. (1935). Ein Beitrag zur Chemotherapie der bakteriellen Infektionen. [**Chemotherapy of Streptococcal Infections**].—*Dtsch. med. Wschr.* **61.** 250-253. 3 figs., 1 table. [7 refs.]

Domagk finds that, in contrast to a series of azo- and acridine compounds which had a relatively high bactericidal action *in vitro* but none *in vivo*, " prontosil " (described as a hydrochloride of 4-sulphonamido-2, 4-diaminoazobenzol) had a definite and relatively specific bactericidal action *in vivo*, though none *in vitro*. Mice, infected intraperitoneally with a definitely fatal dose of a haemolytic streptococcus, were protected by peroral or subcutaneous infection of " prontosil ", the amount required being considerably below the toxic dose. A table of one experiment shows that peroral treatment, given one and a half hours after infection, protected all of 12 mice against a dose which killed 11 of 14 controls within 24 hours, and all within 48 hours. A definitely favourable effect was also shown towards chronic streptococcus infection and towards staphylococcus infection in rabbits, the latter being, however, relatively irregular. No effect could be demonstrated against pneumococcus infections or against other bacteria yet tried.—A. W. Stableforth.

Morosov, B. D., & Striganova, A. R. (1934). L'action stimulante des extraits embryonnaires sur la cicatrisation des plaies chez les mammifères. **[Stimulation of Healing by Embryonic Extracts].**—*J. Physiol. Path. gén.* **32.** 1148-1152. 4 charts. [6 refs.] [Copied *verbatim* from *Physiol. Abstr.* **20.** 269. Signed J. Walter].

Application of extract of human embryos to skin wounds in rats caused marked increase in rate of healing, through more vigorous growth of granulation tissue and epithelial proliferation. The effect is ascribed to nutritive substances (proteoses, polypeptides, glutathione) in the extract.

Lines, E. W. (1935). **The Effect of the Ingestion of Minute Quantities of Cobalt by Sheep affected with " Coast Disease " : A Preliminary Note.**—*J. Coun. sci. industr. Res. Aust.* **8.** 117-119. 2 figs.

Two ewes affected with " coast disease " were given 1 mg. per day of cobalt as cobaltous nitrate. This brought about a marked improvement in the animals' condition, as is shown by graphic representation of the food intake, body weight, the haemoglobin percentage, and percentage volume of red cells. Ewes kept under the same conditions, but not given cobalt, died of " coast disease ". [See also Marston, H. R. – p. 261].—W. I. B. Beveridge.

Grimmett, R. E. R., & Shorland, F. B. (1935). **Use of Limonite in Bush-Sickness. Influence of Cobalt Content.**—*N.Z. J. Agric.* **50.** 367. [1 ref.]

An iron-free extraction of 56 lb. Ruatangata limonite, prepared by Filmer and Underwood's method, gave 3·75 mg. cobalt in the first extraction and 60 mg. in the second. The first extract did not cure one sheep known to be suffering from " bush sickness ", while the second slowly cured the same sheep.

Zinc extracted from the same limonite caused some improvement in a sick sheep. The authors suggest that iron itself is required and is curative, the cobalt acting as a stimulant.—C. S. M. Hopkirk.

Underwood, E. J., & Filmer, J. F. (1935). **Enzootic Marasmus. The Determination of the Biologically Potent Element (Cobalt) in Limonite.**—*Aust. vet. J.* **11.** 84-92. 3 graphs. [16 refs.]

It was previously shown that enzootic marasmus, which had in the past been thought to be due to iron deficiency, could be cured by an iron-free extract of iron ore, limonite [see this *Bull.* **5.** 582]. The authors divided this iron-free extract analytically into four fractions corresponding to the four metal groups. Both the iron group and the zinc group fractions cured the disease while the others failed to do so. The iron group fraction was then found to be contaminated with metals belonging to the zinc group and, when freed of these, it did not cure the disease.

The zinc group fraction was subdivided into a nickel fraction and a nickel-low fraction, but both failed to cure the disease. Then nickel chloride, prepared from B.D.H. nickel oxide, was found to effect a cure. Nickel chloride from a different source, however, failed to cure, as also did zinc. The authors then tried nickel, zinc, manganese and cobalt and found that the latter was effective. Cobalt, administered as cobalt chloride, cured enzootic marasmus in daily doses of 0·1 mg. The authors therefore suggest that the disease is due to a deficiency of cobalt in the food and that cobalt must be regarded as an essential element in animal nutrition. [See also Lines, E. W. – above].—W. I. B. Beveridge.

—. (1935). **Iodine as a Preventive of Goitre in Man and Animals.**—*Lancet.* **228.** 1339-1340.

Reports received from those districts in which there is an environmental deficiency of iodine show that the issue to the populace of iodized salt (1 part KI in 100,000) has been an effective preventive of goitre. Breeders of livestock are recommended to administer a 1 : 200 solution of potassium iodide, the daily dose being three teaspoonsful for a horse, and two teaspoonsful for a pig.—H. DRYERRE.

POISONS AND POISONING.

RAMBE, L. (1935). Uppkomst av inanitionssjukdom hos nötkreatur i samband med för stort tillskott av koksalt i utfodringsstaten. [**Disease in Cattle Due to Excess of Salt in the Food**].—*Svensk VetTidskr.* **40.** 301-304.

In parts of Sweden it is customary for cattle owners to give newly calved cows some salt in their food, amounts up to 250 g. per day sometimes being added. This causes a progressive inanition, accompanied by depraved appetite passing into complete anorexia and wasting. Such cases are described by the author, who comments on the prevalence of such a bad practice [see also this *Bull.* **5.** 160]. —J. E.

—. (1934). **Poisonous Minerals in Plants.**—*Rep. Wyo. agric. Exp. Sta. 1933-1934.* pp. 17-20.

This is a resumé of further work carried out at this station on the toxicity of selenium-containing plants for livestock. It was found that 675 g. of dried *Oonopsis condensata*, when fed forcibly to a calf in eight daily doses, produced typical symptoms of selenium poisoning. Tin and molybdenum have also been found in forage plants, which may sometimes account for their poisonous properties. Those plants which absorb large quantities of selenium from the soil are, however, usually avoided by stock but, having absorbed the selenium those plants probably convert it into a form easily assimilable by forage crops. It has been found that mature alfalfa seldom or never contains selenium in toxic quantities.—G. D. S.

RIMINGTON, C. (1934). **The Chemical Investigation of Poisonous Plants.**—*J. S. Afr. vet. med. Ass.* **5.** 227-244. 1 fig., 2 charts. [12 refs.]

This paper was read at the Annual General Meeting of the South African Veterinary Medical Association. The poisonous constituents were divided into the following four classes :– (1) alkaloids ; (2) glucosides ; (3) bitter principles, and (4) organic acids, resins, oils and substances of ill-defined nature. After describing the methods of investigating these constituents, the author reports on some of his own investigations, including that of the cyanogenetic glucosides in different species of South African plants. After giving an account of the isolation of bitter principles and their effect on fish, he describes the various principles isolated from *Dichapetalum cymosum* and, in conclusion, the work on phylloerythrin, the photosensitizing agent in *Tribulus*, carried out in collaboration with QUIN and described in this *Bull.* **5.** 525, 661 and 760.—E. M. ROBINSON.

SEDDON, H. R. (1934). **Poisonous Plants. Circumstances Under which Losses may Occur.**—*Agric. Gaz. N.S.W.* **45.** 503-506 and 629-632. 7 figs.

General considerations regarding the poisoning of stock by plants are discussed in a popular manner, and then the author very briefly describes plants which in New South Wales have been proved poisonous or harmful to stock. Over 30 plants are listed which may cause harm in certain circumstances, though ordinarily some of these are useful fodder. The symptoms produced by the various plants are briefly indicated. The article is a useful summary of the present knowledge of poisonous plants in New South Wales.—W. I. B. BEVERIDGE.

STEYN, D. G. (1935). **Recent Investigations into the Toxicity of Known and Unknown Poisonous Plants in the Union of South Africa.**—*Onderstepoort J. vet. Sci.* **4.** 399-415. [3 refs.]

This paper contains the results of biological tests on 37 plants. *Agave americana*, the American aloe, produced death in one sheep, apparently due to tympany of the rumen. Two species of *Geigeria*, *G. aspera* and *G. zeyheri*, were tested. Some of the plants which proved toxic, such as *Hertia pallens*, *Ferraria welwitchii* and *Phytolacca dioica*, had not previously been tested. Several acacias such as *A. giraffae*, *A. lasiopetala* and *A. litakunensis*, were found to contain cyanogenetic glucosides, but several others did not. Two species of ragwort, *Senecio glaberrimus* and an unnamed species, produced a fatal intoxication in sheep, with acute parenchymatous hepatitis.—E. M. ROBINSON.

ASTON, B. C. (1934-1935). **Live Stock Poisoning in New Zealand.**—*N.Z. J. Agric.* **49.** 150-155, **50.** 44-46 and 269-273, and **51.** 43-46. 1 table. [2 refs.]

The author delivered an address to the New Zealand Veterinary Association in July, 1934, bringing together all known information on poisonous plants in New Zealand and also mentioning the more common metallic poisoning. The published paper is divided into four parts :– (1) mineral poisons ; (2) indigenous plant poisons ; (3) wild exotic poisonous plants, and (4) cultivated exotic poisonous plants.

The most informative portion is that dealing with New Zealand indigenous plants, 14 of which are mentioned :– (1) *Coriaria* – three or four species – (tutu or tupakihi) ; (2) *Pteridium aquilinum* (bracken) ; (3) *Myoporum laetum* (ngaio) ; (4) *Pimelia* – several species – (Strathmore weed) ; (5) *Brachyglottis rangiora* (rangiora) ; (6) *Urtica ferox* (onga onga or tree nettle) ; (7) *Wintera* (*Drimys*) *axillaris* (horopito or pepper tree) ; (8) *Hydrocotyle asiatica* (pennywort) ; (9) *Edwardsia* (*Sophora*) *tetraptera* – several species – (kowhai) ; (10) *Ranunculus rivularis* – swamp buttercup – (waoriki) ; (11) *Dianella intermedia* (turutu) ; (12) *Euphorbia glauca* (waiuatua) ; (13) *Parsonsia* – two species – (kaiku), and (14) *Corynocarpus laevigata* (karaka).

The coriaria is the native shrub of most interest, in that driven stock are frequently poisoned by the active principle, tutin. The first sheep brought to New Zealand by Captain Cook met this fate. The ngaio tree also causes mortality when it is uprooted during storms and cattle have free access to it.

Of the other poisonous plants the worst are the pimelia, the rangiora, the swamp buttercup and the karaka berry ; the latter contains a cyanogenetic principle when ripe but, when baked, is used by Maoris for food purposes.

The paper brings out one fault, and that is the small account of experimental feeding that has been carried out in New Zealand on plant poisons.—C. S. M. H.

RIMINGTON, C. (1934). *Psilocaulon absimile* **N.E.Br. as a Stock Poison. II. Isolation of the Toxic Alkaloidal Constituent and its Identification as Piperidine Hydrochloride.**—*S. Afr. J. Sci.* **31.** 184-193. 7 figs. [5 refs.] Also appeared in *Onderstepoort J. vet. Sci.* **4.** 421-433.

In the previous article [this *Bull.* **4.** 584.] Rimington, with STEYN, described two toxic principles in this plant, an organic acid (oxalic), and an alkaloid. In this paper the isolation and identification of the alkaloid is described. Piperidine had not previously been found as a naturally occurring alkaloid in plants. Deaths in stock after eating the plant *P. absimile* must be mainly attributed to this alkaloid. Where chronic cases occur after ingestion of the plant, they are probably due to the oxalic acid. The author suggests that the plant might be used commercially as a cheap source of piperidine.—E. M. ROBINSON.

Doak, B. W. (1935). **Cyanoglucosides in White Clover.**—*N. Z. J. Agric.* **51.** 159-162.

Analyses of white clovers show that the best New Zealand mother type [indigenous New Zealand strain] may contain 0·007 to 0·013 per cent. hydrocyanic acid in green herbage while the Kentish wild type contains 0·004 to 0·006 per cent. White clover is the only pasture plant reported in New Zealand as containing more than negligible traces of cyanogenetic glucosides, but there is no evidence to show that the quantity of plant eaten by stock is sufficient to cause poisoning. " Bloat " in cattle has been attributed to HCN poisoning but no evidence is forthcoming to prove that such is the case, and the low HCN content Dutch clover is just as liable to produce " bloat " as the high-yielding HCN strains.

Feed flavours are also considered to be unrelated to HCN content.—C. S. M. H.

Rimington, C. (1935). **Acacipetalin, a New Cyanogenetic Glucoside from South African Species of Acacia. Its Isolation from** *Acacia stolonifera* **Burch. and Chemical Composition.**—*J. S. Afr. vet. med. Ass.* **6.** 136-138. 1 fig. [5 refs.]

The danger associated with the feeding of certain acacia species on account of their containing hydrocyanic acid [cyanogenetic glucoside] was pointed out by Steyn in 1934. Rimington describes the isolation of acacipetalin from *A. stolonifera* and the methods used for its identification. It is suggested that acetone, formaldehyde or its cyanhydrin, and glucose would form not unlikely starting materials for its production.—E. M. Robinson.

Finnemore, H., & Jaffray, A. B. (1935). **The Amount of Hydrocyanic Acid in a Blue Couch Grass,** *Cynodon incompletus* **Nees.**—*J. Coun. sci. industr. Res. Aust.* **8.** 136-138. 7 figs. on 4 plates, 1 table. [3 refs.]

Blue couch grass was proved to be toxic to stock many years ago owing to its HCN content [cyanogenetic glucoside]. The authors estimated the quantity of HCN present in two samples of this grass and found it to be as high as 0·198 per cent. Even after being kept dry for nine months there was a considerable amount of this toxic principle present.—W. I. B. Beveridge.

Cazaban, & Isnard, J. (1935). Contribution à l'étude de la toxicité des tourteaux de lin. [**The Toxicity of Linseed Cake**].—*Rec. Méd. vét.* **111.** 542-545. [2 refs.]

Linase, the enzyme which splits off HCN from linimarin, the cyanogenetic glucoside in linseed cake, is stable at 65° and 100°C. The authors have failed to find any practicable method of rendering the enzyme inactive. They examined many samples of linseed cake suspected of causing harm to farm animals and have come to the conclusion that all samples which generate more than 200 mg. HCN per kg. should be regarded as poisonous. Some samples giving less than this amount may cause harm if fed daily to animals over a considerable period of time.

In testing for HCN production by picrate paper, the test should only be regarded as negative if, after 24 hours' incubation at 38°C., no reddening of the paper results.—G. D. Shearer.

Schang, P. J. (1934). Algunas experiencias sobre la acción toxica del paraiso (Melia azedarach L.). [**Toxic Effect of the China Tree,** *M. azedarach* **L.**] —*Rev. Med. vet. B. Aires.* **16.** Nos. 4, 5, 6. 10-25. 7 tables.

This tree is toxic for pigs and causes many deaths. Insects, even locusts, do not touch the tree, so that it is often the only vegetation left in a district. The author carried out experiments to prove that the fruit, leaves, buds, flowers and

bark were all toxic. He gives in tabulated form the results of the administration of varying doses of the different parts to pigs. The flowers were less toxic than the bark. Sheep were not affected, neither was a rabbit which ate three stems with the leaves. Numbers of locusts, forced to eat the plant, died.

Pilocarpine is of value in the treatment of affected pigs, but only if given within a very short interval.

VUILLAUME, R. (1934). Toxicologie de l'if. [**Yew Poisoning**].—*Rev. vét., Toulouse.* **86.** 305-313. [16 refs.]

This is a review of yew poisoning in which the author has taken no trouble to consult recent literature on the subject, notably the contributions of GULLAND and VIRDEN [(1931). *J. chem. Soc.* July. 2148.] on the chemistry, and NICHOLSON [this *Bull.* **4.** 539.] on the physiology. He describes the parts of the yew tree which are poisonous and the chemical constituents of the leaves, the alkaloid taxine and the glycoside taxicatin. He claims that the leaves retain their poisonous action even after boiling. [This is an obvious inaccuracy as taxine, to which the poisonous nature of the leaves is due, is decomposed at 80°C.].—G. D. SHEARER.

PHYSIOLOGY.

BALLANCE, C. (1934). **The Conduct and Fate of the Peripheral Segment of a Divided Nerve in the Cervical Region when United by Suture to the Central Segment of Another Divided Nerve.** pp. 45. 59 figs. on 16 plates. [2 refs.] London : Macmillan & Co. Ltd. [4to] [7s. 6d.]

This paper records the results of certain experiments carried out in the Research Laboratories of the Royal College of Surgeons, to determine the sequence of events in the peripheral segment of a divided nerve when it is joined by suture to the central segment of another nerve. Details are furnished of 12 operations, all of which were made in the cervical region of cats.

These experiments demonstrate clearly that no anastomosis or union of the divided nerves takes place. The response to suturing is as follows :–

The divided central segment sends out new fibres which penetrate the scar tissue at the seat of the suture and beyond, to form a new living nerve in the place of the degenerated peripheral segment. This new nerve, derived from the axis cylinder of the central segment, while possessing every appearance of the nerve from which derived, appears to have the function of the nerve which it replaces. Two examples will suffice. A severed hypoglossal nerve was joined by suture to the central segment of a cervical sympathetic nerve. On final examination 240 days later the fibres peripheral to the seat of suture proved to be an extension of the sympathetic nerve. Regeneration of the motor end organ and the muscle fibres served took place and, on stimulation, contraction of the muscles of the tongue resulted. Again a severed cervical sympathetic nerve was joined to the central segment of a hypoglossal nerve. Hypoglossal fibres replaced the degenerated sympathetic nerve beyond the seat of suture. These, however, did not extend further than the superior cervical ganglion. Stimulation of the cortical area of the opposite cortex, where the tongue muscles are represented, caused dilatation of the pupil. Similar results were obtained in each of the other experiments in which five other nerves were employed.

There is a note on changes found in the cells of the dorsal vagal nuclei consequent upon division of the recurrent laryngeal nerve and its suture to a divided cervical sympathetic nerve, and also a brief reference to ARGYLE'S work regarding alterations found in the recurrent laryngeal nerve and dorsal vagal nuclei of a horse which in life was a roarer.—C. DAVENPORT.

Ottolenghi, M. (1934). Contributo alla conoscenza delle terminazioni nervose degli organi genitali esterni nei bovini. [**On the Nerve Endings in the External Genitalia of Bovines**].—*Arch. ital. Anat. Embriol.* **32.** 505-519. 12 figs. [Numerous refs.]

A detailed study of the nerve-supply of the penis of bulls has shown that the nerve fibres supplying the outer skin penetrate the epidermis, ramify and terminate in small enlargements between two epithelial cells. The nerve fibres supplying the papillary layer may or may not be myelinated ; those which are myelinated lose their sheath as soon as they enter this layer and give rise to nervous expansions which are of various forms. The nerve-endings may be free or capsulated. In the sub-papillary layer, the genital corpuscles described by Krause are numerous, as also are atypical forms of Pacinian bodies. The nerve-endings are capsulated and exhibit a variety of shapes and forms. Fibroblasts are sometimes present and the cells immediately surrounding the net-work of fibrils in which the nerve terminates possess large nuclei. Ruffini's corpuscles are never present, but occasionally peculiar expansions have been seen. In the centre of these, large cells with small nuclei are present, arising from the expansion of two or three nerve fibres. In the subcutaneous connective tissue, typical Golgi-Mazzoni corpuscles are present. The author concludes that the genital corpuscles have a specific function and play a large part in the reflexes associated with the sexual act.

—J. A. Nicholson.

Zavrnik, F. I., & Mikic, F. (1935). Ueber das normale Blutbild unserer Haustiere – ein Vorschlag zur einheitlichen Untersuchung. [**The Normal Blood Picture of Domestic Animals. Suggestions for a Standard Method of Observations**].—*Vet. Arhiv.* **5.** 324-336 and 337-339. 1 table. [Numerous refs.] [In German].

The authors deplore the difficulty in defining standards as to the normal values in animal haematology. The lack of uniformity in the methods and standards adopted by the various workers prevents the formation of any comprehensive picture by combining the data from the various publications. The question is further complicated by normal variations due to differences of age, sex, climatic conditions and altitude, and by the further difficulty of defining health and normality itself. The authors therefore suggest a uniform schedule of information which should be given in all cases, so that the data collected by each individual may become generally useful.

(1) Hour, day, month and year of the collection of blood.

(2) Type of animal : species, breed, colour, utility, sex.

(3) Age, conditions of climate and altitude.

(4) Condition : weight, general condition. Clinical observations : temperature, pulse, respiration rate, percussion and auscultation of chest, and microscopic observation of the excrement. Pathological observations : macroscopic and microscopic.

(5) Diagnosis (healthy or nature of disease).

(6) Physiological information : period of sexual cycle, pregnancy, whether before or after food or work, whether before or after a journey, whether restraint was used for the collection, and if so the nature of the restraint.

Constitution of the Blood.

(a) Number of erythrocytes in 1 c.mm. Percentage of reticulocytes. Number of leucocytes in 1 c.mm. Number of thrombocytes in 1 c.mm.

(b) Percentage composition of the leucocytes.

(I) Percentage of lymphocytes. Percentage over 12μ. Percentage between 6 and 12μ. Percentage under 6μ.

(II) Percentage of neutrophile corpuscles. Percentage of myelocytes. Percentage of metamyelocytes. Percentages of various forms based on the number of nuclear segments. 1, 2, 3, 4, 5, 6, 7, or more than 7 segments.

(III) Percentage of eosinophile corpuscles. Percentages of the various forms based on the number of nuclear segments.

(IV) Percentage of basophile corpuscles. Percentages of the various forms based on the number of nuclear segments.

(V) Percentage of monocytes.—U. F. RICHARDSON.

HIGGINS, G. M. (1934). **The Blood of the Normal Duck.**—*Folia haemat.* **51.** 230-241. 5 figs., 5 tables. [13 refs.] [In English].

Following a brief review of the literature dealing with the haematology of birds, a description is given of the blood cells of the duck with their numbers and sizes. The same cells that are found in fowls also appear in the blood of ducks. —E. J. PULLINGER.

VUILLAUME, P. (1935). Le liquide céphalo-rachidien normal du chien. **[The Cerebrospinal Fluid of the Normal Dog].**—*Thesis for Docteur vétérinaire, Lyons.* pp. 124. 2 figs., 4 tables. [Numerous refs.]

After describing the anatomical features of the subarachnoid space and the cavities associated with it, the author covers well-worn ground in a discussion on the origin and function of the C.S.F. He concludes that it carries essential salts to the nerve cells and drains away waste products from them.

Puncture of the atlanto-occipital space is considered to be the most suitable means of obtaining the fluid from dogs and appears to be without risk. The head of the dog to be operated upon is fully flexed and a needle inserted at a point 1 to 2·5 cm. behind the occipital protuberance in a slightly posterior direction. The distance between the skin and the subarachnoid space at this point is about 2 to 3 cm. and the moment the needle perforates the capsular membrane and the dura mater the animal struggles. This indicates that the space has been successfully entered.

Normal C.S.F. from dogs is a clear straw-coloured fluid which contains albumin, salts, reducing sugars and traces of urea. It is under an average pressure of 19 cm. of water and usually contains no cells. Occasionally, however, a few lymphocytes may be present.—J. A. NICHOLSON.

MILLER, W. C. (1935). **Difficulties and Complications of the Equine Pregnancy Diagnosis Test.**—*Vet. Rec.* **15.** 1401-1411. [12 refs.]

During the season 1934 to 1935, a considerable number of mares gave a normal positive reaction to the oestrin test, but subsequently failed to produce a living foal. Some of these mares were proved to be suffering from cystic degeneration of the ovaries, in which condition large amounts of oestrin are excreted in the urine, and three others had aborted. A mummified foetus was found in one mare and in another absorption of the placental fluids and liquefaction of the foetus had taken place. The author considers that these animals may have been suffering from vitamin E deficiency. This, he suggests, was brought about by the severe weather which occurred in the early part of 1934. He rightly points out, however, that there is no direct evidence to show that foetal death and resorption occurs in the mare with any frequency. Infertility among mares is usually due to the mare not being served at the optimum time for fertilization of the ovum, to early abortion or to pathological changes in the reproductive tract. There is no doubt, however, that attention to diet and the adequate supply of minerals and vitamins will alone improve the breeding performance of many mares.—J. A. NICHOLSON.

Cuboni, E. (1935). Una reazione chimico-ormonale caratteristica dell' urina di stallone. [**A Characteristic Chemical-Hormonal Reaction in the Urine of the Stallion**].—*Clin. vet., Milano.* **58.** 726-730. 4 figs. on 1 plate, 1 table. [5 refs.] [German summary : abst. from orig.]

On the addition of concentrated sulphuric acid to the benzene extract of acidified, boiled urine of stallions, a blue-green colour is produced. Urine from geldings or non-pregnant mares does not give rise to this colour and it differs from that produced by the urine of pregnant mares. In none of the 16 samples of stallion's urine examined did the reaction fail to develop ; the intensity of the reaction, however, varied from day to day in the same animal. It is not due to the presence of spermatozoa and the author concludes that it must be due to the oestrin known to be present in the stallion's urine, in which case it shows that the oestrin here cannot be identical with that present in the urine of pregnant mares. Extraction of the testes of bulls and donkeys failed to reveal the presence of an oestrogenic hormone.—J. A. Nicholson.

Burrows, H. (1935). **Pathological Conditions Induced by Oestrogenic Compounds in the Coagulating Gland and Prostate of the Mouse.**—*Amer. J. Cancer.* **23.** 490-512. 23 figs., 1 table, 1 chart. [Numerous refs.]

—. (1935). **Oestrin and the Prostate.**—*Brit. med. J.* Sept. 7th. 460-461. [1 ref.]

It has been shown that prolonged treatment with oestrin produces the formation of stratified, squamous, keratinizing epithelium in the prostate glands of mice, particularly in the coagulating gland which secretes a substance which coagulates the contents of the seminal vesicles. These changes are very similar to those seen in the vagina during the oestrous cycle and are more easily produced by bi-weekly applications of oestrin to the skin of the interscapular region or by subcutaneous injections of this substance. Discontinuance of the oestrin treatment is followed by a loss of the keratin and stratified epithelium, and the normal structure of the alveoli returns. It is suggested that oestrin acts selectively on tissue derived from the Müllerian ducts. There appears to be no histological difference between the enlarged prostates seen in man and those produced in mice by oestrin.—J. A. N.

Curson, H. H., & Malan, A. P. (1935). **Studies in Sex Physiology, No. 13. The Changing Proportions of the Merino Lamb from the Second to the Fifth Month of Prenatal Life.**—*Onderstepoort J. vet. Sci.* **4.** 481-492. 28 figs. on 2 plates, 4 tables, 5 charts. [8 refs.] [For abst. of previous articles of this series, see this *Bull.* **5.** 528].

This article is one of a series which has appeared on the development of the merino lamb. In the comparison of the body form, it is striking how the general change becomes less marked as the age increases, and from the 96th day there is comparatively little change. The most important external change between the 96th and 115th days is the acquisition of a coat. In the first six weeks, growth in weight takes place at a very slow rate, but at 100 days the average daily increase in weight is almost 62 g. The general trend in growth for the human embryo agrees well with that of the sheep. Several charts are given showing the comparative age-weight-growth-rate of lambs, comparative age to crown-rump-length-growth-rate, the comparison of relative increases in weight and crown-rump-length, etc. —E. M. Robinson.

Bertrand, G., & Bhattacherjee, R. C. (1935). Recherches sur l'action combinée du zinc et des vitamines dans l'alimentation des animaux. [**The Combined Action of Vitamins and Zinc in Animal Nutrition**].—*Ann. Inst. Pasteur.* **55.** 265-272. 5 graphs. [20 refs.]

When mice were fed after weaning on a synthetic diet, carefully freed from traces of zinc but containing adequate amounts of vitamins A, B and D, they lost weight and died more quickly than litter-mates on the same diet supplemented by 2 mg. of zinc per 100 g. of food. Analysis of the carcasses showed the zinc content of those receiving the zinc supplement to be double that of mice receiving none. The authors thus claim to have shown that the physiological action of the vitamins, or of one of the vitamins, is dependent upon the presence of traces of zinc.—A. EDEN.

ACKERKNECHT, E. (1935). Unselbständige Körperzellen in typischen Lebensgemeinschaften (germinativer und nervöser Art). [**Cells of the Body which are not Self-Supporting and their Behaviour (Spermatozoa, Ova and Ganglion Cells)**].—*Berl. tierärztl. Wschr.* **51.** 449-452. 4 figs.

There are certain cells in the body which depend on other cells for their existence ; these are the reproductive cells and the ganglion cells, especially those of the central nervous system. Before spermatozoa are capable of fertilizing an ovum they must undergo developmental processes and there is no evidence for supposing that they themselves possess the power of maturation ; it is certain, however, that special cells in the tubules of the testis and in the epididymis ensure the ripening of the spermatozoa. They have in fact a purely parasitic existence and do not even provide themselves with the means of life when they leave the epididymis. Similarly, the ovum is surrounded in the follicle by special " nurse " cells which are supported by the basal membrane. The ovum also receives nourishment from the liquor folliculi and the theca interna but, unlike the spermatozoa, provides itself with its own deuteroplasm. In both the testis and the ovary, the reproductive cells obtain their food from the vessels across a basal membrane and, up to the present, no direct communication with the nervous system has been discovered. The ganglion cells and their processes are also dependent for their development on " nurse " cells and receive their nourishment indirectly. Although all the three types of cells discussed here are not self-supporting, when fully developed, they exercise profound effects on the animal body.—J. A. NICHOLSON.

TECHNIQUE.

MCCARTNEY, J. E. (1935). Nährbodenbehälter mit Schraubkappenverschluss. (Ihre Anwendung für die aerobe und anaerobe Züchtung, sowie für die Blutkultur). [**Culture Media Containers with Screw Caps**].—*Zlb. Bakt. I. (Orig.).* **134.** 486-488. 1 fig. [3 refs.]

To replace the common method of putting up media in test tubes plugged with wool and possibly capped with rubber, the author recommends the use of small screw-topped bottles with aluminium caps to fit. Media can be placed in these bottles just as in test tubes and sealed with a disc of waxed paper underneath the screw cap. Where a gas-tight seal is not required, a screw cap having a hole cut in the centre is used. Bottles of this type are useful for anaerobic or aerobic culture, and they preserve the medium in good condition and prevent it from drying out.—E. J. PULLINGER.

ELSER, W. J., THOMAS, Ruth A., & STEFFEN, G. I. (1935). **The Desiccation of Sera and Other Biological Products (including Microörganisms) in the Frozen State with the Preservation of the Original Qualities of Products so Treated.**—*J. Immunol.* **28.** 433-473. 8 figs. [10 refs.]

The authors describe in detail both methods and apparatus for the drying of

biological products. The methods involve freezing and storage of the product *in vacuo*. Chemicals such as P_2O_5 and refrigerants coupled with the use of a high vacuum were used for the disposal of water vapour during the drying process. It is not possible to summarize adequately the necessary details, it being sufficient to state that the authors claim that, when clear serum is treated by their method, it breaks up into a fine powder, is readily soluble in water and, when restored to the fluid state, is found to have suffered no deterioration in potency. Bacteria and yeasts have also been preserved unchanged by this method and even such delicate organisms as the gonococcus and the meningococcus have been preserved for 18 years. Attempts to preserve protozoa and spirochaetes have been made, but the results were not encouraging.—R. Lovell.

Giemsa, G. (1935). Die Romanowsky-Färbung protozoischer Blutparasiten in alten Trockenaustrichen. [**The Staining of Protozoa in Old Dry Blood Smears by the Romanowsky Method**].—*Zlb. Bakt. I.* (*Orig.*). **134.** 483-486.

In old blood preparations, stained by the Romanowsky method, the typical rose colouring of the corpuscles, the red of the protozoan chromatin and the blue of the cytoplasm are obscured by a general blue-violet tint which arises owing to an alkaline decomposition of the material. This decomposition may set in early, particularly if the slides are exposed to warm moist conditions, such as sea transport in the tropics. The author recommends that such slides should be despatched in metal cylinders at the bottom of which is placed some calcium chloride in a linen bag. A wad of cotton wool should separate the slides from the calcium chloride bag, and the lid of the cylinder should be made air-tight by plaster tape. Smears which have been kept dry in a desiccator can be stained by Giemsa's stain, and differentiated in a weak solution of sodium phosphate (NaH_2PO_4) to which a trace of eosin has been added, even after 28 years. The differentiation requires from one to four minutes, and the correct point can be judged macroscopically by the change of the blue colour to a delicate red-brown.—U. F. R.

Abet, H. (1935). Zur Technik der Geisseldarstellung nach Gray. [**Gray's Method of Flagella Staining**].—*Zlb. Bakt. I.* (*Orig.*). **133.** 465-467. [2 refs.]

The author employed Gray's method for the staining of flagella. Subcultures of the organism are made on fresh nutrient agar and from the fourth, when eight hours old, two loopfuls of condensation water are removed and added to 2 to 3 c.c. distilled water. This suspension is allowed to stand for two hours at room temperature. From this, three loopfuls are removed to form a drop on a hand-warmed slide and a film is obtained by shaking. It is essential that the slide be unscratched and properly cleaned. The film is dried in a dust-free incubator and fixed carefully and lightly by passing through the flame.

Mordanting is carried out in a mixture of the following two solutions, freshly made up :– (1) saturated solution of potassium alum, 5 c.c. ; saturated solution of mercuric chloride, 2 c.c.; 20 per cent. solution of tannic acid, 2 c.c., and (2) saturated alcoholic solution of basic fuchsin, 0·4 c.c.

Films are mordanted for seven to ten minutes, thoroughly washed in running water and stained for five minutes in Ziehl's carbol fuchsin. The staining is best carried out in a receptacle to prevent precipitation of the stain.—D. R. Wilson.

I. Lépine, P. (1935). Méthode de coloration histologique du névraxe pour l'étude cytologique de la rage et des maladies à virus (inclusions nucléaires et inclusions protoplasmiques). [**Technique for Staining the Brain and Spinal Cord for the Cytological Study of Rabies and Other Virus Diseases (Inclusion Bodies)**].—*C. R. Soc. Biol. Paris.* **119.** 804-805. [3 refs.]

II. Lépine, P., & Sautter, V. (1935). Sur les lésions spécifiques des neurones dans la rage à virus fixe. [**Specific Lesions of the Nervous System in Rabies due to a Fixed Virus**].—*Ibid.* 805-807. [3 refs.]

I. The author adopts the following method for staining brain and spinal cord tissues : it is suitable for the histological study of nervous tissues and for the cytological study of rabies and other virus diseases, where inclusion bodies are a feature.

After good fixation of the tissues in Bouin-Duboscq-Brasil mixture, sections are prepared and stained for ten minutes in a mixture of solutions A and B in equal parts :- A, basic fuchsin, 1 g., alcohol (50 per cent.) 200 c.c., and B, aqueous solution of safranine, 1 : 500. Sections are then treated with acetone alcohol to differentiate, washed rapidly and treated with " permanganate " (Stevenel's technique). They are now differentiated in acetone alcohol, washed, dehydrated, commencing with 95 per cent. alcohol, cleared and mounted in balsam. Nuclear inclusions and other pathological formations are made particularly apparent.

II. Working with laboratory animals, the authors have made a study of the changes which occur in the neurons in rabies due to the fixed virus. Three types of lesion were met with :- (1) Negri bodies, which are always smaller and rarer in rabies due to fixed virus than in that due to street virus : they are devoid of internal structure and have a very feeble affinity for eosin in Mann's staining method ; (2) nuclear inclusions, which are oval or round hyperchromatic bodies appearing in the interior of a uniformly oxyphile nucleus from which all trace of normal chromatin has disappeared : the inclusions may be numerous in the same cell and are found in the median part of the external zone of Ammon's horn and in certain cell groups of the base of the brain ; (3) fine intraprotoplasmic inclusions found frequently in the cells presenting lesions of type 2 and also in the pyramidal cells of Ammon's horn.—D. R. Wilson.

I. Salmony, A. (1935). Fortschritte in der Lumineszenz-Analyse. [**Improvements in Fluorescence Analysis**].—*Berl. tierärztl. Wschr.* **51.** 532-534. 1 fig. [Numerous refs.]

II. Kufferath, A. (1935). Das moderne Fluoreszenzmikroskop als Hilfsmittel in der Veterinärkunde. [**The Use of the Fluorescence Microscope in Veterinary Medicine**].—*Münch. tierärztl. Wschr.* **86.** 316-318. 2 figs.

I. The author briefly reviews the progress in fluorescence analysis as used in medicine. Many substances, animal, vegetable or mineral, fluoresce with an individual tint when subjected to ultra-violet light and this property, which is a fixed one, is utilized in identifying substances, liquids, etc. Wood's glass, used for instance in the diagnosis of ringworm, is the dark glass filter which is placed between the light source and the object in order to cut out the visible rays. With the latest portable fluorescence analysis lamp, described in this paper, the tube containing the mercury and electrodes is made of this dark glass so that no additional filter is necessary.

Recently, fluorescence analysis has been used very advantageously in the study of chlorophyll and iron-free haemoglobin, the decomposition products of which include the porphyrins, which are concerned in the genesis of photosensitization.

II. A detailed description of a new apparatus made by Reichert for use with a microscope in observing fluorescence in thin sections of tissue.—J. E.

Pommer, A. (1935). Die Röntgendiagnostik und -therapie in der Veterinärmedizin. [**X-Ray Diagnosis and Therapy in Veterinary Medicine**].—*12th Int. vet. Congr. 1934.* **2.** 585-602. [In German]. [Also published in *Wien. tierärztl. Mschr.* **22.** 321-335].

The text of a paper presented at the 12th International Veterinary Congress at New York, 1934, by the Director of the X-Ray Institute attached to the Medical Clinic at Vienna Veterinary College.

After seven years' experience, Pommer reviews the field of diagnosis and therapy by X-rays and deals systematically with the disease conditions of interest in this respect.

The subject matter is not abstractable.—J. E.

Abshagen, H. G. (1935). Schutzglocke zum Bunsenbrenner, ein Hilfsgerät für das bakteriologische Arbeiten. [**A Protective Glass Screen for Bunsen Burners**].—*Zlb. Bakt. I.* (*Orig.*). **134.** 489-490. 1 fig. [1 ref.]

The author describes a glass shield shaped like a thistle funnel to fit on a bunsen burner. The lower narrow opening slides over the barrel of the burner and is held in place by a collar and set-screw. The bowl encloses the bunsen flame. Any laboratory worker knows how difficult it is to sterilize a platinum loop, contaminated with culture of tubercle bacilli, in a bunsen flame without particles of culture jumping off before they are fully sterilized. This shield is designed to catch such particles and prevent them from contaminating the laboratory bench.

—E. J. Pullinger.

Schmid, F. (1935). Beitrag zur Technik der helminthologischen Untersuchung. [**A Note on Helminthological Technique**].—*Zlb. Bakt. I.* (*Orig.*). **134.** 150-151.

A method is described for the collection of small worms such as *Ostertagia*, *Strongyloides* and *Capillaria*. The intestinal contents are mixed with an equal volume of a 1 per cent. solution of sodium carbonate ; a thin piece of wood, about the thickness of a match, is then slowly drawn through the mixture. The worms thus " raked " out are washed off with a little physiological saline and examined.

—E. L. Taylor.

MISCELLANEOUS.

Stenius, R., Svanström, F., & Ehrström, W. (1935). **Veterinary Institutions in Finland.** pp. 74. 1 table. Helsingfors : Vet. Dep. Min. Agric. [8vo]. [In English – translated by E. Birse].

This book has been written and translated into English for the purpose of informing people in foreign countries of the present state of veterinary affairs in Finland.

Administration.—In 1930, an Act was passed creating a veterinary department of the Ministry of Agriculture. It has full control of all veterinary work in the country, except private practice.

Veterinary Training.—Several attempts have been made since 1822 to establish a veterinary college, but without result, although in 1932 a proposal was made to establish an agricultural college incorporating a veterinary faculty. Veterinary surgeons have, therefore, to go abroad for their instruction, the majority to Germany. The government has a scholarship scheme for veterinary students studying abroad. Before being allowed to practise in Finland, graduates have to attend a three weeks course and to pass a qualifying examination.

Veterinary Practice.—There are seven categories of veterinary activity :- (1) Government district veterinary surgeons : these are the senior posts, and there is one for each of 53 districts into which the country has been divided ; their work is largely administrative ; (2) 25 municipal veterinary surgeons ; (3) 69 communal veterinary surgeons who are employed by rural communities :

in addition to meat inspection, these officials also engage in clinical work ; (4) 28 whole-time meat inspectors ; (5) 49 private veterinary practitioners ; (6) veterinary graduates engaged in teaching and research in the Agricultural Faculty of the University and in the State Veterinary Laboratory respectively, and (7) army veterinary officers.

State Veterinary Laboratory (Helsingfors).—This was established in 1908 for the purpose of special diagnosis and the preparation of vaccines, etc. In 1935 it was divided into six sections (to deal with infectious diseases, bacteriology, pathology, food hygiene, sterility and research).

Disease Control.—According to the law passed in 1922, the following diseases were declared as important, notifiable and subject to control by the veterinary department : strangles, anthrax, tuberculosis, glanders, swine erysipelas, fowl cholera, swine plague, bovine contagious abortion, blackleg, ringworm, epizootic lymphangitis, piroplasmosis, rinderpest, foot and mouth disease, contagious bovine pleuro-pneumonia, contagious pustular stomatitis, influenza catarrhalis and influenza pectoralis in horses, swine fever, sheep pox, rabies, fowl plague, sheep scab, mange in various animals, and malignant catarrh in cattle. In addition to these, the government have the power to declare other troublesome diseases controllable in the same way ; thus, avian tuberculosis, bacillary white diarrhoea and equine infectious anaemia have recently been placed under control.

Meat Inspection.—Meat inspection has recently been made compulsory throughout the country. All towns with populations over 4,000 must have an abattoir where meat inspection by a veterinary surgeon is carried out. The government has the power to order meat inspection also in rural areas. Technical directions are given for examining carcasses and for steps to be taken on the finding of notifiable disease.

Milk Inspection is under the control of local authorities, but the Government veterinary department exercises supervision.

The Army Veterinary Corps was established in 1918, during the Finnish War of Liberation. At present there are 18 veterinary surgeons attached to the army, in ranks corresponding to those of other countries.—J. E.

Postiglione, E. (1935). Il servizio veterinario e le più gravi malattia diffusibili del bestiame nelle nostre colonie dell'Africa Orientale. [**The Veterinary Service and Diseases of Animals in Italian Colonies in East Africa**].—*Clin. vet., Milano.* **58.** 614-690. 7 text figs., 2 figs. on 2 plates, 1 table.

The fascist government has placed the rearing of livestock as the chief consideration in its programme for the development of its African colonies, and as veterinary officers who have little or no experience of tropical diseases are likely to be drafted to the colonies in the near future, the author describes some of the more important diseases met with in East Africa and discusses the difficulties in carrying out the programme laid down by the government.

Trypanosomes are wide-spread and are transmitted by varieties of *Glossina*, Tabanidae and *Stomoxys*. Horses, cattle, camels, mules and dogs are affected, but not man. A combination of " naganol " and " antimosan ", given intravenously, is used for treatment.

Rinderpest causes severe losses both in Eritrea and Italian Somaliland. Up to 90 per cent. of a herd of cattle may be lost in a single outbreak. Simultaneous inoculation of hyperimmune serum and formolized vaccine is practised.

African horse-sickness also occurs.

The losses from contagious bovine pleuro-pneumonia in Eritrea are almost as numerous as those from rinderpest. The method of immunization practised is

the subcutaneous inoculation into the tail of 0·5 c.c. of lymph obtained from the pulmonary lymph glands of animals which have been killed in the first stage of the disease.

Goats still represent the greater proportion of the livestock of Italian Somaliland, and outbreaks of epizootic haemorrhagic septicaemia are common. An acute attack runs a course of three to 14 days ; animals chronically affected remain ill for 25 to 30 days or longer. The mortality rate may be as high as 100 per cent. A satisfactory vaccine has not yet been prepared.

Infestation with *Anthostrongylus somalilensis*, which in its adult stage lives in the small intestine of dromedaries, is a serious disease ; it is characterized by fatty degeneration of the liver and intense inflammation of the small intestine. The disease is most prevalent during the rainy season and runs a course of one to two months. Treatment with anthelmintics is of little avail : hygienic measures, particularly scrupulous care in maintaining watering places free from infection, offer the best means of keeping the disease in check.

Piroplasmosis has not yet been recognized in Italian Somaliland ; in Eritrea, however, the disease is present in its latent form and is often a serious complication of rinderpest or horse-sickness.—J. A. Nicholson.

Postiglione, E. (1935). Il patrimonio zootecnico dell' Eritrea e della Somalia Italiana. [**Animal Husbandry in Eritrea and Italian Somaliland**].—*Clin. vet., Milano.* **58.** 691-711. 3 figs. [Numerous refs.]

An account is given of the climatic conditions and types of livestock found in the Italian East African colonies. From the point of view of the livestock owner, Eritrea may be divided into three zones. In the highlands, the climatic conditions are approximate to those of the continent of Europe, whereas in the littoral and lowlands the climate is tropical. The rainy season in the former lasts from June to September and in the latter from December until March or April. Zebu cattle, dromedaries, sheep, goats, horses, donkeys and mules constitute the livestock of the country and the chief problem of their maintenance is one of food. The food supply could be greatly improved if irrigation schemes were carried out on a large scale and, if this problem were overcome, the author considers that the country could support a flourishing chilled meat industry.

In Italian Somaliland, large sandy wastes are to be found, especially near the coast. Some areas, however, support vegetation for a short period after the rainy season. In the interior of the country, thick forests occur and rich areas of alluvial soil are also found. Here the natives maintain the majority of the cattle found in the country. These are zebus which have been crossed with native breeds. Apart from these areas, the chief problem of developing livestock rearing is one of maintaining adequate water supplies.

The livestock census figures in 1929 for Eritrea were :- 748,400 cattle, 116,000 horses, 77,000 camels and 1,842,000 sheep and goats. The figures for Italian Somaliland were :- 1,113,000 cattle, 789,000 dromedaries, 1,826,000 sheep and goats and 13,400 horses.—J. A. Nicholson.

I. —. (1935). Utkast til reglement for Norges Veterinaerhøiskole. [**Constitution of the New Veterinary College of Norway**].—*Norsk. VetTidsskr.* **47.** 288-296.

II. —. (1935). Veterinaerhøiskolen. Forelöbig plan for veterinaerstudiet. [**Preliminary Prospectus of the Veterinary Course**].—*Ibid.* 418-431.

I. A general plan of the constitution of the new veterinary college at Oslo, drawn up by the Ministry of Agriculture. The subject has been dealt with in six chapters with 31 paragraphs under the following headings :- (1) the purpose of

the college; (2) instruction; (3) examinations; (4) students; (5) teachers and staff, and (6) the management of the college. Besides teaching veterinary science for the veterinary diploma, the only one entitling the holder to bear the title veterinary surgeons, the purpose of the institution is to carry out scientific research work to the extent possible with the available staff and accomodation.

The duration of an ordinary course of study is calculated to last not less than five sessions and a half, that is, eleven terms (autumn term about 15 and spring term about 20 weeks each). The High School certificate is required by all students before entrance to the college is allowed. On recommendation by the board of professors, the Ministry of Agriculture makes the selection amongst the applicants for admission. Before each session, the Ministry decides how many new students shall be admitted for study that year. Foreigners will be permitted if they do not occupy seats required for native students.

The college is under the direct supervision of the Ministry of Agriculture, and the Rector is elected from among the professors for a period of three years, by the Board of Professors. This board, which also acts as the Board of Governors, consists of all professors engaged at the College, with the Rector as chairman. [The cost of the buildings, their equipment and the expenditure for ordinary maintenance of the college are met from government sources except for small amounts received, such as students' fees which are less than £10 each for a whole course. The college started last autumn with 15 students].

II. Although the main principles of the veterinary curriculum have been laid down in I, full particulars of the course of study, comprising the division of the course, syllabus of the instructions, fees to be paid, rules for the examinations and the mark-giving system adopted, are given in this second publication from the Ministry of Agriculture, Oslo.—GUSTAV NAERLAND (FARSUND).

ALEKSA, K. (1935). Inasas i Lietuvos veterinarijos istorija. [History of Veterinary Medicine in Lithuania].—*Vet. ir Zootech. Kovno.* **12.** 65-76. [5 refs.] [Abst. from French summary].

A record of veterinary medicine in Lithuania from early times up to the position in the 19th century.

An account is given of the first veterinary college in eastern Europe, founded in 1775 at Horodnice, near Grodno, transferred to Vilno in 1780, and taken over by the Russian government in 1840.

GUINSBOURG, I. V. (1935). L'organisation vétérinaire en U.R.S.S. [Veterinary Services in the Union of Socialist Soviet Republics].—*Bull. Off. internat. Epiz.* **10.** 317-331. Discussion pp. 439-441. 2 tables. Also appeared in *Rev. gén. Méd. vét.* **44.** 449-463].

In the U.S.S.R., veterinary medicine is exclusively a state service. Under the Soviet system the former small farm system has been replaced by large exploitations, rendering veterinary control of epizootics much easier. All veterinary services are under the Veterinary Director General of the Agricultural Commission, the Commissariat of Agriculture of the Union, Regional and Provincial Directors of Agriculture, and Chief District Veterinarians. Uniform veterinary measures applying to the whole of the Union for the control of disease are in process of elaboration. There are 2,000 veterinary hospitals, newly built and furnished; there are 5,600 districts under veterinary supervision and 8,000 auxiliary stations. There are also 116 supervising and quarantine stations and exportation and importation stations on the eastern frontier, 625 veterinary stations on railways and canals, 92 veterinary laboratories, and 412 stations for the control of meat and milk inspection. In addition there are numerous research institutes which are

[illegible] in this article, together with some results of their work. The whole [illegible] boys 8,200 veterinary surgeons and 12,000 veterinary assistants. [illegible] veterinary high schools and 83 technical schools for veterinary [illegible] In schools there are 12,500 students and the annual graduation is 1,500. [illegible] technical schools with 12,000 students furnish annually 2,400 trained [illegible] 40 per cent. of the students are women. [The nature of the courses of [illegible] students" is not clear: presumably only a proportion will be fully qualified veterinarians].

[illegible] the veterinary services has advanced considerably during the past few years. [illegible] 30, 48 million roubles were allotted; by 1935, the cost had grown to 243 [illegible] roubles. As a consequence of the new régime, rinderpest has completely [illegible] and, and glanders and contagious bovine pleuro-pneumonia of cattle are on the eve of being entirely suppressed.—F. BULLOCK.

TOPACIO, T., KRINAS, E. C., CARLOS, S. A., DE JESUS, Z., & TURLA, F. F. (1935). [illegible] the Committee on Diseases. [Philipp. Vet. Med. Ass.]—*Philipp. J. anim. Indust.* **2.** 105-109. 1 table.

[illegible] report of the more important animal diseases of the Philippine Islands.

BACTERIAL DISEASES.

[illegible] haemorrhagic septicaemia are present as earth-borne infections and [illegible] losses. Nineteen persons died after eating meat from a bovine that [illegible] anthrax. Glanders is prevalent and causes severe losses. It is at present [illegible] to eradicate it by slaughter as funds for compensation are not available. [illegible] reference is also made to "salmonellosis of swine", "infectious abortion of swine" and fowl typhoid.

PROTOZOAN DISEASES.

[illegible] some losses in horses, and piroplasmosis and anaplasmosis are very dangerous [illegible] susceptible imported cattle.

VIRUS DISEASES.

[illegible] For the first year since its introduction in 1886 no cases were observed [illegible] controlled by the prohibition of importation of cattle from infected countries, by constant surveillance of cattle and by mass vaccination.

[illegible] MOUTH DISEASE.—Eradication is to be undertaken by government action. It is at present wide-spread but mild in character.

[illegible] diagnosed in one pig, two horses and in a number of dogs.

[illegible] prevalent; plans for its control are also in course of preparation.

FOWL PLAGUE caused severe losses during 1934.—J. E.

—. [1935]. **Bibliographic References.**—*Med. J. Aust.* Nov. 17th. 651-652.

[illegible] dealing with the use and recording of bibliographical references. Long [illegible] unnecessary references are considered a form of conceit and betray a desire [illegible] part of the author to impress readers with an erudition that he may not [illegible] Numerous references tend to use up valuable space in a journal. References [illegible] be made to original articles in order to avoid mistakes. If abstracts [illegible] references by other authors are used as sources of information, such [illegible] Details of the system of recording references by the journal in question are given, together with reasons.—H. McL. GORDON.

RUS[illegible] (1934). **Zooprophylaxis Failure. An Experiment in the Philip-**[illegible] *Malariol.* **13.** 610-616. 2 tables. [9 refs.] [In English: Italian [illegible]] [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 432. Signed W. F.]

Zooprophylaxis is not only of doubtful value in the Philippines, but may actually be a danger. It has nowhere been shown to be an effective direct weapon against malaria. On alternate nights, the author tied up four buffaloes, one on each side of a native house at a distance of a few yards. Inside the house was a man under a mosquito net. The mosquitoes in the house were caught every 2 hours during the night for a period of two months. Many more anophelines were caught when the buffaloes were present than when they were absent. When an animal barrier was present, three times more anopheles were caught than on the nights when there was no barrier.

COLEMAN, F. F. (1934). **Pest Destroyers, 1934.**—*Rep. Dep. Agric. Qd. 1933-1934.* pp. 120-130. 16 tables.

A report of the work carried out under the Pest Destroyers Act of 1923 ; the only information of veterinary interest is that referring to cattle and sheep dips. The regulations require that cattle dip concentrates must be homogeneous and, when diluted in accordance with the instructions on the labels, must give fluids containing one-fifth of 1 per cent. arsenic trioxide. The standard for arsenical sheep dips provides that the dipping fluid obtained on dilution must contain from 0·2 to 0·25 per cent. arsenic trioxide. Tables illustrate the composition of numerous proprietary preparations.—W. I. B. BEVERIDGE.

OFFICIAL AND OTHER REPORTS.

GREAT BRITAIN. (1934). **Report of the Agricultural Research Council for the Period July 1931 – 30th September 1933.** pp. 205. 4 appendixes. [Numerous refs.] London : H.M. Stat. Off. [8vo] [3s.]

This also includes the report of the Committee of the Privy Council for the Organisation and Development of Agricultural Research for the period 28th July, 1930, to 30th September, 1933. It was on the recommendation of the Privy Council that the Agricultural Research Council was created, and the charter is set forth in appendix I. Under the Provisional Note of Administrative Arrangements (appendix II), the procedure by which the Agricultural Research Council gives advice on agricultural research to the agricultural departments and to the Development Commission is laid down. Other matters dealt with in the Privy Council report are the financial arrangements and the relationship of the Agricultural Research Council to pre-existing bodies.

The Agricultural Research Council began its work by making a comprehensive survey of the agricultural research now being carried on in Great Britain.

To deal with its various activities, six standing committees were formed, *viz.* animal diseases, animal nutrition, dairying and animal products, plants, soils and agricultural economics. The composition of these committees is given in appendix III. Special committees have been appointed to deal with :– bovine contagious abortion, swine fever, Johne's disease, braxy-like diseases in sheep, fowl paralysis and helminths of immediate importance to animal health. Two special committees dealing with disease in animals have been appointed jointly by the Medical Research Council and the Agricultural Research Council, *viz.* the Joint Committees on Tuberculosis and on Iodine Deficiency and Thyroid Disease. In 1933 a subcommittee also reviewed the work of the Foot and Mouth Disease Research Committee at the request of the Ministry of Agriculture and Fisheries.

Each section of the report is preceded by an account of the recent history and present state of knowledge of the subject. The sections of special interest to the veterinarian are those on (a) animal heredity and genetics ; (b) animal physiology and nutrition, and (c) diseases of animals.

Animal Heredity and Genetics.—Within the last 30 years, research on breeding has made considerable progress. Owing to cost, investigations have of necessity been carried out on smaller animals, but the results show that the underlying principles of heredity are the same in the animals investigated. A résumé is given of the work carried out at (1) the Small Animal Breeding Institute, Cambridge; (2) the Northern Poultry Breeding Station, Reaseheath, Nantwich, Cheshire, and (3) the Department of Research in Animal Breeding, University of Edinburgh.

At the Small Animal Breeding Institute, Cambridge, research has been carried out on (1) fecundity; (2) sex linkage in fowls; (3) sex linkage in ducks, and (4) inheritance of egg colouring. Work on rabbits has been directed mainly to a study of the genetics of coat colour and the size and pattern of the coat.

At the Northern Poultry Breeding Station, Reaseheath, problems of direct interest to the poultry breeders in the surrounding counties have been studied. The Agricultural Research Council advised on a future programme for this station.

The Institute of Animal Genetics, Edinburgh, was visited by a sub-committee of the Agricultural Research Council in October, 1932, and the work of the department was examined and recommendations were made. The work done is summarized under the following heads :– general genetics, rabbit genetics, physiology of reproduction, sex endocrinology of the fowl, livestock breeding and biology of the fleece.

Animal Physiology and Nutrition.—It is now known that many diseases are due to faults of nutrition, and thus a close liaison exists between the study of disease and the general study of nutrition. A historical survey of knowledge on this subject is given. It is pointed out that diseases due to mineral deficiency are more prominent in farm stock than deficiencies in vitamin supply. Then follows the present research position at the Rowett Research Institute, Aberdeen, and at the Institute for Animal Nutrition, Cambridge University. In the original programme, broadly speaking, Aberdeen undertakes work on the minerals and vitamins, and Cambridge on the protein, fat and carbohydrate requirements of animals. The Physiology Department of the Rowett Institute has worked on the respiratory exchange in fowls and on a study of the urine and blood in relation to the low respiratory quotient found in other animals; on carbohydrate absorption and metabolism in ruminants, etc.; on the influence of vitamin D on calcium and phosphate metabolism; on the movements of the alimentary canal and on the relation between nutrition and disease. Work is also being done on the composition of the blood of cows, on the chlorine requirements of farm animals and on the effect of calcium deficiency in the blood of breeding ewes. The work of the Cambridge Institute is divided into several sections – physiology of growth and reproduction, chemistry, calorimetric measurements and poultry nutrition.

Diseases of Animals.—In this extensive section, a résumé is given of research in Great Britain during the early part of the present century and also of recent research. [References to publications on animal diseases appear at the end of the section]. Until the last decade, research into the causes and prevention of diseases of animals had not been carried on as actively in the British Isles as in many other countries. Some amends have been made – the Laboratory of the Ministry of Agriculture at New Haw was opened in 1917, the Research Institute at the Royal Veterinary College in 1923, the Institute of Animal Pathology, Cambridge, in 1923, and the Institute of the Animal Diseases Research Association of Scotland at Moredun in 1926. The Committee for Research into Foot and Mouth Disease was appointed in 1924, and took over the Cattle Testing Station at Pirbright. Under " Recent Research in this Country " a review of work carried out on the following diseases is given :– tuberculosis, Johne's disease, bovine contagious

abortion, mastitis, infectious sterility, diseases due to infection with anaerobic bacilli, foot and mouth disease, " louping ill ", swine fever, swine erysipelas, contagious dermatitis in sheep, " scrapie ", " grass-sickness " in horses, dog distemper, diseases of poultry and deficiency diseases, etc.

A section of the report is devoted to parasitology, and a review is given of work now being carried out at various institutes, etc.

Under the heading " The Future of Research in Animal Diseases " there are memoranda on developments considered desirable in the near future by the Ministry of Agriculture and Fisheries and the Department of Agriculture for Scotland which were communicated to the Agricultural Research Council. The recommendations of the Council on research studentships, veterinary education and research and on the veterinary schools and colleges are described.

At the conclusion of the Council's report a list of grants made is given, and also a complete index of personal names, government departments, institutions and other bodies and scientific subjects.—J. C. Wallace.

Great Britain. (1935). **Twenty-Fourth Report of the Development Commissioners being for the Year ended 31st March, 1934.** pp. 122. 2 tables. London : H.M. Stat. Off. [8vo] [2s.]

This report refers mainly to the purposes for which advances from the Development Fund were recommended by the Commissioners during the year for assisting agriculture and rural economy. The detailed purposes to which grants were applied are accounted for and described in reports issued by the Government Departments, or other recipients of aid from the Fund. Descriptions of the scientific work of the Institutes and reviews of the work in progress appear in other publications.

The close relationship between the Development Commissioners and the Agricultural Research Council is commented upon ; as at present constituted, the personnel of the Commission and the Council are closely linked. The functions of the Department of Agriculture, the Commissioners and the Council are complementary and the present position represents a method of organization that has resulted from a close study of the whole subject of research in relation to the agricultural industry.

In the section on Agriculture and Rural Economy a brief outline is provided of the growth of each institution and experimental station in Great Britain aided by grants, together with the resources now available for research, the branches or sections under which the work of the institutes is organized, the staff employed and the total income available. The growth of Advisory and Local Investigation Services is reviewed. The Special Research Grants made to individual workers on the recommendation of the Agricultural Research Council are stated ; also it is noted that the Council awarded three Agricultural Research Scholarships and two Studentships for Research in Animal Health during the year.—J. C. Wallace.

Great Britain. (1935). **Statistical and General Report, Army Veterinary Services, 1934-1935.** [Tapley, J. B.] pp. 24. 11 tables. London : War Office. [8vo].

This report opens with a statement of the strength of the British Army in horses (12,807) and mules (297) during the year under review. This is followed by a short account of the incidence of disease under various headings, *viz.* digestive system, surgical conditions, etc. No marked variation from the previous year is noted. Tables of mortality, of inefficiency and wastage and of the effect of age on these, are given separately. There is a similar report in reference to army animals in Egypt, the strength of which is shown as 1,784 horses and 608 mules.

The annual report of the Army Veterinary School at Aldershot is included in the pamphlet, with a list of the courses of instruction held during the year and a short account of the work of the school laboratory.

Difficulty was experienced with dissociation of the strains of *Pfeifferella mallei* used in mallein production. Further experimental work was carried out in connexion with pustular dermatitis. Increased resort to radiography in diagnosis is reported. The introduction of a special type of " grid " enabled increased clarity to be obtained. The instructional and productive work of the School of Farriery for the year is also given.—C. DAVENPORT.

AUSTRALIA. (1935). **Eighth Annual Report of the Council for Scientific and Industrial Research for the year Ended 30th June, 1934.** pp. 77. Canberra : L. F. Johnston, Commonwealth Govt. Printer. [fcp] [3s. 4d.]

The report deals with many investigations of veterinary importance carried out by the Council's Divisions of Economic Entomology, Animal Health and Animal Nutrition.

DIVISION OF ECONOMIC ENTOMOLOGY.

The division has liberated parasites of the buffalo fly, *Lyperosia exigua*, in Northern Australia. The effects of such biological control cannot be determined for at least two years. Studies on the susceptibility of sheep to blowfly strike confirmed the importance of the degree of development of crutch wrinkles in determining infestation. Of the Canberra flock used for observations, 43 per cent. of the A class (plain-bodied sheep) and 100 per cent. of the C class (wrinkly sheep) were struck. Similar results were obtained in the field. Two large-scale trapping experiments in New South Wales and Western Australia indicated that trapping, when efficiently carried out, reduced the number of strikes by approximately 50 per cent. Jetting with 1 per cent. calcium arsenite gave marked protection for over four weeks, strikes which did develop being limited in extent.

Intensive experiments were carried out to determine whether *Anaplasma marginale* might be transmitted by the stable fly, *Stomoxys calcitrans*. As a result it was considered that the transmission by this fly under natural conditions was extremely unlikely. As confirmation of this it was not found possible to transmit the organism from affected to healthy animals by needle stabs when the needle was only inserted to a depth corresponding to the maximum length of the proboscides of biting flies. It was, however, found possible to induce a strong immunity to *A. marginale* by inoculation with *A. centrale*.

DIVISION OF ANIMAL HEALTH.

The Animal Health Station at Townsville continued work on contagious bovine pleuro-pneumonia. The modified complement-fixation test developed there had given very satisfactory results in 10,000 individual tests. The test must be carried out by highly skilled workers ; the importance of this is emphasized in the report. Pleuro-pneumonia culture vaccine prepared at the laboratory is being extensively tested under field conditions in the Northern Territory.

" Peg-leg " investigations offered considerable evidence that this is in fact a condition of aphosphorosis, and that material benefit is obtained by the administration of phosphatic supplements.

Work on the tick-borne diseases showed the importance of babesiellosis in North Queensland. Experiments indicated that cattle which have recovered from babesiellosis are not immune to *Babesia bigemina*. On the other hand, cattle which have recovered from *B. bigemina* are resistant to *Babesiella* sp.

At the McMaster Animal Health Laboratory in Sydney, the study of foot-rot indicated the importance of Strongyloides larvae in providing a portal of entry

for the causal organism. Work on factors influencing the passage of fluids through the ruminant stomach indicated that passage direct to the abomasum might be effected with considerable regularity by the administration of copper sulphate solution. It was suggested that this salt might serve as a medium for the carriage of other drugs. There was no evidence that preliminary starvation increased the efficiency of either carbon tetrachloride or copper sulphate. In regard to tick paralysis in dogs, caused by *Ixodes holocyclus*, it was found that the aetiological factor is present in the salivary glands of the engorging adult female tick, and the M.L.D. of salivary gland emulsion was determined. It was found that the serum of dogs hyperimmunized to tick paralysis was capable of neutralizing the salivary toxin, and such serum had been extensively used for curative purposes.

Vaccination against caseous lymphadenitis had been tested on a large scale in Southern Queensland, but the results were not yet available. It had been possible to recover the organism from the soil of sheep camps and from the faeces of selected sheep. Other investigations of the Animal Health Division included bovine enzootic haematuria, " coast disease ", contagious mammitis and, in Western Australia, enterotoxaemia and enzootic ataxia in lambs.

Division of Animal Nutrition.

This division continued its investigation on the protein metabolism of sheep, and showed experimentally that the growth of wool of sheep subsisting on pure protein rations could be augmented by an additional supply of cystine. Experiments on the Ca/P metabolism of sheep indicated that sheep might assimilate as much phosphorus from the relatively insoluble mineral rock phosphate as from the expensive dicalcic and monocalcic phosphates. The fluorine in rock phosphate was not considered to be of danger, provided that the fluorine content of the phosphatic supplement was not higher than 1·3 per cent. On the other hand, where 500 mg. of fluorine was fed per day, anorexia developed after nine months, followed by rapid decline in weight and death. Young animals fed from 115 to 150 mg. per day began to show symptoms after one year. It was concluded that the continual ingestion of from 2 to 3 mg. of fluorine per kg. body weight is well tolerated by sheep, and that the ingestion of up to 80 mg. of fluorine per day in the form of rock phosphate will not be followed by any symptom of chronic fluorine poisoning.—I. Clunies Ross.

Australia, New South Wales. (1935). **Department of Agriculture. Live Stock Diseases Report (No. 10) Recording Control Work during the Year ended 30th June, 1934.** [Henry, M.] pp. 22. 7 tables. Sydney : Govt. Printer. [8vo].

An agreement has been entered into with South Australia whereby the interstate traffic in livestock and animal products has been freed of unnecessary restrictions. The diagnostic and research work at Glenfield Veterinary Research Station is briefly reviewed. Overseas quarantine regulations were recently completely revised.

Contagious Bovine Pleuro-Pneumonia.—The situation regarding this disease has not changed materially during the year. The complement-fixation test for the detection of " carriers " is expected to be of great assistance in its control.

Anthrax.—In addition to the areas which are recognized as infected, one outbreak occurred in a district considered to be free from this disease. The source of infection was suspected to have been the fertilizer.

Tuberculosis.—Work done under the tuberculosis-free herd scheme increased but was not pushed, as it is considered that tuberculosis-free area work is preferable.

Swine Fever.—No outbreaks were recorded.

Piroplasmosis.—Fewer outbreaks were recorded than during the previous year and these were all within the recognized infected zone.

Black Disease.—During this year the mortality increased on properties where little or no action had been taken in the past to deal with the control of flukes and black disease. The results of vaccination experiments are recorded : the percentage loss in controls and in animals vaccinated two and three times was 3·95, 1·7 and 0·47 respectively. Where snail destruction – the ideal method of combating black disease – is not practicable, it is considered that consistent drenching with carbon tetrachloride over a period of years keeps the disease under control.

Cattle Tick Control.—Work done in this connexion is fully described. Although no eradication programme was undertaken, considerable progress was made in that direction and future work is visualized. There has been no extension of the infested area. These results may in part be due to the fact that climatic conditions were not favourable to the tick during the year.

Louse and Ked Infestation in Sheep.—The geographic distribution of these parasites, as controlled by climate, is described. Lice are commonest on the " slopes " and plains where hot summers are encountered, while the ked is almost confined to the tablelands and higher " slopes " where the climate is colder and the rainfall greater.

Enterotoxaemia.—The season was not very favourable for the disease but a few losses occurred, principally of the " pulpy kidney " type of disease in lambs.

Poultry Diseases.—Infectious catarrh has caused considerable mortality on occasion and no satisfactory means of control are available. Coccidiosis principally affected the later hatched birds. The need for a reliable anthelmintic to deal with worm infestation was again demonstrated. Excellent results again attended the use of vaccination against fowl pox. *Salmonella pullorum* infection caused considerable losses, and the work of attempting to eradicate the disease from three properties was continued.

Swine Compensation Act.—Tuberculosis continues to be the cause of about three-quarters of condemnations of carcasses, while infection with *S. cholerae-suis* increased considerably.—W. I. B. Beveridge.

Irish Free State. (1935). **Veterinary College of Ireland. [Report for 1933-34].** —*3rd. Ann. Rep. Minist. Agric. I.F.S. 1933-34.* pp. 28-40 and [21]. 1 table.

The number of students was 83 : of these, 23 were new entrants and seven graduated during the year. The report deals with diagnostic work, chiefly of poultry diseases, and the general incidence of disease. Poultry blood samples to the number of 73,900 were tested for *Salmonella pullorum* infection. The agglutination test for stock birds is regarded as being helpful towards the elimination of the infection. *S. pullorum* infection and coccidiosis head the list, tuberculosis being third. As regards cattle, of 639 blood samples tested for contagious abortion, 105 gave a positive agglutination reaction. The intradermal tuberculin test was in frequent use in the diagnosis of bovine tuberculosis. There was much work on the diagnosis of parasitic worm infestation of the alimentary canal of horses. The most important diseases of sheep and goats were " joint ill ", gastro-intestinal strongylosis, and abscess formation in the lungs of sheep. Two cases of parasitic broncho-pneumonia and one case of primary miliary tuberculosis of the lungs were investigated in pigs.
—M. Burke.

County of Midlothian (Scotland). (1935). **Report by County Veterinary Inspector under Milk and Dairies (Scotland) Act, 1914 for the Year 1934.** [Ritchie, J. N.] pp. 13. 8 tables. [fcp] [Mimeographed].

County of Midlothian (Scotland). (1934). **Report by County Veterinary Inspector under Diseases of Animals Acts, for Period 1st July to 31st December 1934, with Annual Summary for Year 1934.** [Ritchie, J. N.] pp. 5. [fcp] [Mimeographed].

These reports summarize the work of the county veterinary department during the year. Dairies in the county have been visited at least three times and those in burghs four times. Cows in unregistered premises have been examined as opportunity offered when other visits were being made.

About half of the herds are " flying herds "; the difficulty in establishing self-contained herds is in most cases connected with lack of accommodation for rearing young stock. The standard of cleanliness of cows has improved during the past few years.

The average number of cows in the county area is 5,545 and in the burghs 222. Excluding tuberculosis, 253 diseased cows have been found in dairies.

Tuberculosis Order of 1925.—Fifty-six animals have been dealt with under this Order and, of these, 28 were found at routine inspection. Four cows were slaughtered under the Order as a result of reports from the City of Edinburgh veterinary department, that calves suffering from congenital tuberculosis had been slaughtered at Gorgie abattoir.

During the whole of 1934, confirmed cases of disease under the Diseases of Animals Acts were, in addition to the 56 cases under the Tuberculosis Order, five cases of anthrax and one outbreak of sheep scab.

Appendixes to the reports give details of investigations in connexion with bulk samples of milk which contained tubercle bacilli, show the number and nature of bacteriological examinations undertaken during the year, and record the work done in connexion with meat inspection.—E. Brown.

County of Wigtown (Scotland). (1935). **Report by the Veterinary Inspector for the County of Wigtown and the Burghs of Stranraer, Wigtown and Whithorn, for the Year ending 31st December, 1934.** [M'Quaker, J.]—*Ann. Reps. publ. Hlth Dep. Wigtown 1934.* pp. 91-102. 5 tables.

Diseases of Animals Acts.

Anthrax.—118 reports of suspected anthrax were received, and disease was confirmed in 11 cases.

Tuberculosis.—Notifications received, 447; found on dairy herd premises, 25; found in auction marts, 5; number declared to come within the scope of the Order, 381. No suspected case of any other notifiable disease was reported.

Sheep Scab.—One case was suspected, but not confirmed.

Milk and Dairies (Scotland) Act, 1914.

There are in the county 693 premises registered under the Act, with about 26,000 dairy cows, and 78 unregistered premises with about 1,200 cows. All cattle on registered premises were inspected at least once, and nearly all those on unregistered premises were examined. A temporary assistant veterinary inspector was appointed from 28th January to 30th April to assist in the routine inspection.

Most of the inspections were made when visiting farms in response to reports of suspected existence of disease, with the result that only 25 cattle were found to be affected with tuberculosis which were not reported. M'Quaker believes that with greater frequency of inspection a considerably larger number would be found, which would benefit the dairying industry as sources of infection would be eradicated at an earlier date. The problem of tuberculosis in dairy herds is interesting most farmers and the attitude towards the problem has changed completely during the last year or two.—E. Brown.

County Council of Durham (England). (1935). **Veterinary Department. Annual Report of the Chief Veterinary Officer for the Year 1934.** [Allan, H. B.] pp. 40. 10 tables, 2 graphs. Durham : Advertiser Printing Works. [8vo].

Details of the work carried out by the Veterinary Department during the year are set out under the usual headings. A feature of the report is that under each heading appears a précis of the principal provisions of the legislative measure concerned, the administrative procedure being concisely described.

Under the Milk and Dairies (Consolidation) Act of 1915, it is noted with satisfaction that the number of samples of milk found to contain tubercle bacilli has shown a progressive decline from 29 in 1931 to 17 in 1934.

Milk and Dairies Order (1926) and Tuberculosis Order (1925).—There are in the county 3,226 registered dairy herds, with an estimated cow population of over 30,000. Visits to farms made under this Order numbered 4,096. As a result of these inspections, 144 animals were slaughtered under the Tuberculosis Order. Every opportunity is taken during routine visits to advise farmers as to the first symptoms of disease which might contaminate the milk supply and progressive improvement has resulted. During routine inspection, many cases of Johne's disease have been noted and it would appear that this disease is becoming increasingly prevalent in the county.

Routine inspection work has been limited owing to the demand made on the services of the veterinary officers by sheep scab duty.

The main feature of the work under the Diseases of Animals Acts and Orders during the year has been the administration of the sheep scab regulations. The prevalence of this disease has shown a favourable decline.—E. Brown.

Sudan Government. (1935). **Annual Report of the Sudan Veterinary Service, 1934.** [Williams, H. B.] pp. 29. 7 tables. [fcp] [Mimeographed].

The four main sections of the report deal with Diseases of Animals, Trade in Livestock and Products, Improvement of Livestock, and Miscellaneous Activities. The Report of the Veterinary Research Officer is given as an appendix.

In preliminary notes on Staff, the retirement of Mr. Kennedy, who held the post of Director for the preceding ten years, is recorded.

" Mr. Kennedy took over a semi-military Department, with a staff of 17 British and 16 Egyptian Veterinary Officers, a classified subordinate staff of 33, and a native police force of about 160 (armed) men. During his tenure of office the Department was reorganized on a purely civil basis. Considerable economies in staff were effected, and later, for financial reasons, still further reductions were made, leaving at the time of his departure a staff of 13 British Veterinary Officers, a subordinate classified staff of 19, and a force of 60 Native Stock Inspectors. . . . As an extension to the Native Stock Inspectors the training of a variable number of ' tribal retainers ', maintained at tribal expense, was instituted. . . . This new Service has, during the three years of its existence, worked very smoothly, and it is only the superimposition of reductions on financial grounds upon those already effected in the interests of interior economy that have made it difficult to provide adequate service for the area which the organisation has to cover ".

Diseases of Animals.

Rinderpest was of about the same intensity as the previous year ; approximately 10,000 deaths were reported in areas under veterinary control. Serum supplies were adequate and no very large outbreaks occurred. There was not, however, enough serum for an adequate reserve stock to be maintained.

Contagious Bovine Pleuro-Pneumonia.—Losses of less than 1,000 head were reported ; nearly 800 of these occurred in Kordofan and Darfur where, " owing to delay in reporting, considerable time elapsed between the appearance of the disease and the vaccinating of the cattle ". The popularity of vaccine (already well established in the north) is gradually extending to the southern provinces.

Foot and Mouth Disease.—An outbreak occurred in Kordofan but, as usual, was of a mild type and was easily brought under control. It interfered somewhat with the cattle trade.

Trypanosomiasis.—Cases occurred in well-known infected areas in the south central and southern Sudan. No detailed information is available.

Diseases of Camels.—Trypanosomiasis occurred frequently, owing to heavy rains and extensive tabanid fly infestation. However, diagnosis by the mercuric chloride test and treatment with " naganol " kept the losses down to 1·8 per cent. of losses from all causes. 3,234 native camel owners paid for treatment of their camels ; this was an increase over the numbers in any previous year. Mange and contagious cutaneous necrosis caused no more than normal trouble.

Diseases of Equines.—Horse-sickness, epizootic lymphangitis and ulcerative cellulitis occurred, but not to an abnormal degree.

Rabies showed a considerable increase, 30 cases being diagnosed in material sent to Khartoum as compared with six in the previous year. Most northern and central provinces were affected. The destruction of stray dogs, jackals, hyenas, etc., was continued.

Trade in Livestock and Products.

Exports of cattle and sheep were more than doubled, largely owing to a joint survey of the trade by representatives of the Egyptian and Sudan governments. The value of these exports was £E.50,311 as compared with £E.24,210 in 1933.

Estimated camel exports were 30,000 head, at an average price of about £E.6.

Exports of hides dropped slightly, from £E.36,210 in 1933 to £E.34,788 in 1934. Skin exports, however, increased from £E.51,687 to £E.78,956.

The value of clarified butter rose from £E.24,640 to £E.27,300.

There was a considerable increase in the numbers of cattle, sheep and goats slaughtered locally, but fewer camels were slaughtered owing to the good prices obtainable for export. The total increase in animals slaughtered locally was small.

Improvement of Livestock.

Measures to improve cattle were limited to encouragement to castrate unsuitable bull calves. Native stock inspectors and tribal retainers used a bloodless castrator. Imported bulls and their progeny (if any) invariably died.

Improvement of horses continued, due to the use of imported sires, but at a lower level than in earlier years. At the end of the year there were 31 government-owned stallions at stud.—S. C. J. Bennett.

Sudan Government. (1935). **Annual Report of the Veterinary Research Officer, 1934.** [Bennett, S. C. J.]—*Rep. vet. Dep. Sudan. 1934.* pp. 22-29.

Routine and research are separately dealt with. The general tendency, following that of earlier years, was for routine to increase at the expense of research.

Rinderpest Serum.—The total output aimed at was 5,000 litres ; of this 4,767 litres were prepared. Towards the end of the working season (at Malakal) the potency of the serum fell below standard. Trypanosomiasis (*T. congolense*) was responsible for these shortcomings ; 25 to 30 per cent. of serum producers were affected and these could not be replaced during the working season. Fortunately, virus producers, being drawn from a special area, were all healthy. " Anxiety continued for the health of the subordinate staff. Their quarters were mosquito-proofed, but nevertheless every laboratory attendant was sick at some time or other with malaria. This year again, as in 1933, they were, however, conveniently sick one at a time, and the continuously threatened breakdown in work did not occur." Working conditions generally, however, were quite favourable.

Bovine Contagious Pleuro-Pneumonia Vaccine.—The output increased from 26,420 doses in 1933 to 47,260 in 1934.

Camel Trypanosomiasis Control.—Increases occurred in demands for

diagnostic materials and " naganol " from 2,901 units in 1933 to 4,219 in 1934. Most of the increased demands came from private camel owners who pay for treatment.

Morbid Specimens.—Most specimens diagnosed were uninteresting, but the following are specially noted, not for their essential rarity, but because it is the first time they have been encountered in the Sudan :– (a) positive agglutination test to *Brucella melitensis* in a goat ; (b) actinomyces pneumonia in a mule ; (c) *Actinomyces necrophorus* infection of a bull's liver ; (d) cutaneous sporotrichosis in a camel ; (e) *Linguatula serrata* (larvae) infection of a bull's liver, and (f) *Cysticercus bovis* infection of the liver of a bull with all other tissues apparently free.

Little research work was done, but the following is recorded :–

Rinderpest Serum.—

" In 1932 attempts were made to reduce the intensity of hyperimmunisation by retaining the maximum tolerated dose [of virus] and prolonging the interval between doses . . . no great success attended the efforts. In 1934 the alternative way of reducing the intensity has been studied, i.e. reduction of the size of hyperimmunising doses of virus while retaining the minimum practicable interval. The results were approximately the same as those in the first series of experiments, in that by this method also no great reduction in intensity of hyperimmunisation seems practicable."

Bovine *T. congolense* Infection.—The curative value of " antimosan " (Bayer) was confirmed. Doses lower than those recommended by the manufacturers proved inefficacious.

Equine *T. congolense* Infection.—The successful treatment of one naturally occurring case of this infection with " surfen C " (Bayer) is recorded. It is observed that this drug cannot safely be given intravenously or subcutaneously.—S. C. J. B.

Burma. (1934). **Report on the Veterinary Department, Burma for the Year ending the 31st March 1934.** [Mitchell, D. T.] pp. 28. 7 tables, 2 graphs, 3 maps. Rangoon : Supt. Govt. Printing & Stationery. [8vo] [Rs.2·8] [3s. 9d.]

Some reduction of veterinary activities in Burma in 1934 was made necessary owing to the reduction in the departmental vote demanded by the general financial situation. The two remaining district dispensaries were closed down, and travelling was curtailed, but the reduced staff was able to carry out the major duties efficiently.

The number of cases of non-contagious diseases treated was reduced, but the veterinary hospital at Insein maintained an average of 19·8 cases a day, the predominant conditions treated being wounds, helminthic infestations and digestive complaints. Amongst contagious diseases, rinderpest, foot and mouth disease and haemorrhagic septicaemia were prevalent throughout the greater part of the province ; anthrax occurred in 28 districts and surra in nine districts, and in one district an outbreak of nematode infestation in cattle and buffaloes caused 179 deaths. 680 outbreaks of rinderpest occurred during the year (16,517 deaths being reported), the system of control adopted being segregation and the serum-alone inoculation of in-contacts. A reduced dose of serum, which was obtained from India, was utilized, in view of the need for economy, and was found to give a satisfactory immunity for ten days. 103,437 animals were inoculated. A quarantine station was established during the year for the examination of cattle going to Rangoon market from central Burma, as outbreaks of rinderpest have been traced to infection picked up at this market. If this station proves successful, it is proposed to extend this system. " Until more supervision can be exercised over trade cattle in transit and over cattle markets, the spread of rinderpest over long distances will continue to be possible and frequent, and its suppression will cost the province a large sum of money annually." It is suggested that the aim should be a compulsory inoculation of cattle with an active virus before they are allowed

to leave the breeding grounds. Goat virus has been obtained from Madras, and tests of its immunizing value have been commenced.

3,825 bovine animals and over 3,000 elephants were inoculated against anthrax during the year with a spore vaccine. In the case of elephants over 30 years old a more attenuated vaccine, as used for equines, has been adopted, followed six weeks later by vaccination with the bovine strain. 2,377 deaths occurred from haemorrhagic septicaemia, preventive inoculation with vaccine being found effective in controlling and eradicating outbreaks.

In addition to research work on rinderpest and anthrax, the preparation of vaccines and the routine examination of specimens, work has been undertaken on osteoporosis, kumri and " dry coat " but with no definite results. The work on surra has been continued and it has now been demonstrated that horses can be protected by the administration of " naganol " at intervals of 42 days.

Field research was continued during the year and a sick camp for elephants was formed, at which investigations were carried out on helminthic and warble infestations, surra and " thoot ". Preliminary investigations have been undertaken into a disease known as " lebet-na " which is believed to be due to nematode infestation and sometimes almost assumes the proportions of an epizootic.

Educational activities were continued at Insein, where 21 students were enrolled for a course of training for one year. These men are to form a new grade which will replace the assistants trained in the three-years' vernacular course. Arrangements have also been made to send six selected students to the Madras Veterinary College.—U. F. Richardson.

Nigeria. (1935). **Annual Report of the Veterinary Department for 1934.** [Henderson, W. W.] pp. 32. 4 tables. London: Crown Agents. [8vo] [3s.].

The European staff consists of 17 veterinary officers, 3 laboratory assistants, 1 mechanic and 10 stockmen, with African clerical and field staffs.

During the year, legislation has been introduced for controlling the movements of trade cattle. Border inspection posts have been established and also control posts on the main trade cattle routes, where cattle are inspected and detained in quarantine if necessary. Antirinderpest spleen vaccine is given to all cattle considered to be susceptible to rinderpest, and also contagious pleuro-pneumonia vaccine. Treatment for trypanosomiasis is also given at control posts along routes where cattle are liable to infection. These measures are part of a scheme for controlling contagious diseases initiated in collaboration with the French veterinary authorities.

At Kano, a school for the training of native personnel has been established and there is also a completely equipped serum and vaccine laboratory nearly completed, these being provided from funds supplied by the Kano Native Administration.

The hides and skins improvement scheme has continued to be operated by the department; the value of exports has increased by £125,526 over the figures of 1933 to a total of £715,541. Details are given of various drying methods which were tried. Castration of unsuitable male goats is part of the scheme and this is proving successful, there being no local objection to the use of the Burdizzo instrument; attempts are also being continued to introduce the fine skin Sokoto red goat to other Provinces in Northern Nigeria where conditions are similar to those in Sokoto. Clarified butter (ghee) production has been taken over from the Department by a large commercial firm which has found satisfactory export markets for all that can be produced.

There has been a slight upward trend in local cattle prices. 271,690 cattle

were slaughtered in the Northern Provinces and 164,955 were exported to the Southern Provinces.

Preparation of other animal products for marketing has been demonstrated, *viz.* dried meat and sterilized milk, the latter being sent in bottles over 700 miles, a two days' journey by rail in an ordinary guard's van from the Plateau Province, where milk is plentiful, to the coast where only tinned milk is available.

RINDERPEST.—Disease control continues to occupy the greater part of the department's energies – 342,116 cattle were permanently immunized against rinderpest, 64,228 received rinderpest vaccine and 6,917 were given anti-rinderpest serum only. 445,853 cattle received blackleg vaccine and 56,325 contagious pleuro-pneumonia vaccine. 14,000 and 1,126 were treated for trypanosomiasis and redwater respectively.

Losses from rinderpest have been very low during the year except in Bornu and Adamawa Provinces, where political conditions and shortage of staff have prevented veterinary measures from being carried out vigorously. The proportion of immune animals is increasing each year and, actually, the greater part of the losses which are experienced are among the young untreated animals.

CONTAGIOUS BOVINE PLEURO-PNEUMONIA.—The incidence of this disease is said to be on the decrease among Nigerian cattle, but trade cattle continue to be the main cause of dissemination of the disease ; slaughter of infected animals and also of in-contacts, if quarantine cannot be arranged, is practised.

ANTHRAX.—One severe outbreak occurred ; it was successfully dealt with by the use of a vaccine.

FOOT AND MOUTH DISEASE.—No severe outbreaks occurred ; in those reported symptoms and lesions were said to be mild.

BLACKLEG.—Very few cases were reported. The wholesale annual vaccinations appear to have been quite effective.

TRYPANOSOMIASIS is probably the most wide-spread of all diseases among cattle in Nigeria. Drug treatment remains the only means of dealing with the disease. Tartar emetic has been found the best means of treatment in horses and cattle, both as regards cost and results.

GRIFFITHS states that during the past four years 10,854 cattle have been treated in Zaria, these being animals fit enough to travel in for treatment ; the mortality was 2·8 per cent. while under treatment. Much higher mortality is experienced among animals already too weak to be brought in for treatment ; when treated, the losses in such animals may be 10 per cent. and in individual herds a greater mortality occurs. Treatment is of greatest value in the early stages. Some animals recover without treatment, if they have ample food and rest. Working cattle usually relapse when put to hard work after treatment. Repeated treatment with tartar emetic eventually causes losses from destruction of liver tissue. Fulani cattle owners are enthusiastic regarding treatment, and those who have had animals treated are definitely of the opinion that animals are more resistant after one attack of the disease has been treated. This has also been observed when animals recover without drug treatment. It is of special importance to use freshly made solutions of a reliable preparation of antimony tartrate of B.P. specification. Solutions prepared from antimony tartrate stored in open containers or paper packets lose their trypanocidal value.

A few cases of tuberculosis, heartwater and anaplasmosis were diagnosed. They appear to be enzootic and wide-spread.

Streptothricosis and demodectic mange are known to be wide-spread both in cattle and goats. Poisoning from the leaves of cassava (*Manihot palmata*) in goats was reported.

Contagious pleuro-pneumonia of goats caused 1,700 deaths in one district

alone in the Adamawa Province. Epizootic lymphangitis and trypanosomiasis of horses and donkeys are the only endemic equine diseases reported. There was one case of tetanus.

Rabies has been troublesome in the Plateau Province; a phenol antirabic vaccine is being prepared from sheep's brain and has since been brought into use.
—J. A. GRIFFITHS.

BASUTOLAND. (1935). **Annual Report of the Principal Veterinary and Agricultural Officer for 1934.** [HENDERSON, G. T.] pp. 1. [fcp] [Typescript].

As the new Chief Veterinary and Agricultural Officer only assumed duty in October, there is no detailed report and only one page of figures relating to animal disease statistics, etc., is provided.—J. E.

COLONY OF MAURITIUS. (1934). **Report of the Veterinary Division for 1933.** [LIONNET, F. E.]—*Rep. Dep. Agric. Mauritius, 1933.* pp. 24-25. 1 table.

ANIMAL DISEASES.—28 cases of surra in cattle were observed: all recovered after treatment with " atoxyl " and arsenious acid. Six horses affected with surra were destroyed. 142 cattle were tested with tuberculin with negative results. 1,520 doses of BCG were issued to cattle breeders. Fowl pox vaccine was prepared and issued on a small scale.—J. E.

I. MOROCCO. (1935). Rapport sur le fonctionnement du Laboratoire de Recherches vétérinaires des T.O.M. en 1934. **[Report of the Veterinary Research Laboratory, Casablanca, Morocco, for 1934].** [VELU, H.]—*Rev. vét. milit.* **19.** 103-109. [24 refs.]

II. MOROCCO. (1935). Rapport sur le fonctionnement du Laboratoire de Recherches du Service de l'Elevage du Maroc pendant l'année 1934. **[Report of the Research Laboratory of the Livestock Service of Morocco for the Year 1934].** [VELU, H.]—*Arch. Inst. Pasteur Algér.* **13.** 263-277.

I. This report is divided into three parts. The first deals with research in hygiene and pathology. The following are among the more important subjects considered: diagnosis, preventive inoculation and prophylaxis of equine infectious anaemia and dourine; the value of " gonacrine " in the treatment of piroplasmosis; the bacterial flora of wounds; the use of " evipan " intravenously, and digital injections in the relief of lameness. The above are only briefly reviewed in this report, but in the text is included the titles of the special papers in which are recorded the details of the investigations in question. These papers have already been dealt with in this *Bulletin* under their respective headings.

The second part of the report contains a list of the various samples of pathological material received at the laboratory during the year. Part III refers to the course of instruction held at the laboratory.

II. Substantially the same as I.—C. DAVENPORT.

SOUTHERN RHODESIA. (1935). **Annual Report for the Year 1933: Entomological Branch.** [JACK, R. W.] pp. 18. Salisbury: Agric. Lab. [Mimeographed].

The chief entomologist reports that, in the operations against the encroachment of *Glossina morsitans* in the northern part of the colony, the position appears to be under control, as no noticeable spread has been recorded during the last three years since the game restriction cordon was completed round the edge of the infected area. Regret is expressed for the large-scale destruction of wild game that was necessary in these operations, but definite improvement has followed where aggressive tactics against the fly have been pursued. The control of traffic,

especially pedestrians, leaving a " fly " area presents many difficulties and cannot be effectively controlled by regulations.

Chrysomyia [*Cochliomyia*] *bezziana* Villen is one of the most important pests of cattle in the colony and its control is exceedingly difficult under existing conditions. No parasites preying on the early stages of this pest, which could be used for purposes of control, have been discovered.

Further study has been made of the habits of blood-sucking flies affecting livestock, *viz. Philaematomyia crassirostris*, *Lyperosia minuta* and *Stomoxys* spp. These flies may be concerned in the mechanical transmission of animal trypanosomiasis. A survey of the ticks of Southern Rhodesia has been continued and *Rhipicentor gladiger* Neu, is a new record for the colony, having been taken on a dog.—J. S. Steward.

Finland. (1935). Eläinlääkintölaitos maatalous-ministeriön eläinlääkintö-osaston kertomus vuodelta 1934. **[Report of the Civil Veterinary Department for 1934].** [Kankaanpää, V.] pp. 42. 18 tables. [Abst. from Swedish and French summaries]. Helsingfors. [4to].

Staff.—Dr. Väinö Kankaanpää was Chief Veterinary Officer to the Ministry of Agriculture, Dr. Rainer Stenius was Deputy C.V.O. and Dr. Richard Hindersson was in charge of the State Veterinary Laboratory at Helsingfors, with Dr. Veikko Rislakki [formerly named Svanberg] as Chief Assistant and Dr. Pehr-Ivar Stenius as Second Assistant. At the end of 1934 there were 262 qualified veterinarians in Finland. [Their mode of work and general organization is explained elsewhere in this *Bull.* **6.** 279].

State Veterinary Laboratory.—This institute carries out general diagnostic work and prepares vaccines, etc. Some 19,800 samples of material – chiefly serum for serological diagnosis – were examined during the year : this included a greatly increased testing for bovine contagious abortion.

Infectious Diseases of Animals.—27 cases of anthrax were diagnosed, and strangles was epizootic in the isthmus of Karelia adjoining the U.S.S.R. The progress of tuberculosis eradication is shown in tables. Out of 158,225 cattle tuberculin tested, 0·84 per cent. reacted strongly and 2·48 per cent. weakly (= 3·32 per cent. positive). Corresponding figures for 1,208 swine and 602 poultry were :– 0·25 and 1·49 per cent., and 2·99 and 0·66 per cent. respectively. Another table shows the reaction percentage of cattle tested between 1908 and 1934. The percentage figure was never above 8·5. 372 fresh farms were found infected with bovine contagious abortion [total figures not given].

Rabies was diagnosed in 21 dogs [see also this *Bull.* **5.** 627].

Sheep scab was observed for the first time in Finland in 1934. Five flocks were affected but the disease was stamped out.

Information on other diseases is given only in tables (figures only). [Names of diseases are in Finnish and Latin or French].

Meat Inspection was made compulsory in 1934, and 24 abattoirs are now under supervision. In addition, 72 " meat control stations " for country districts were organized. Figures relating to the amount of meat dealt with and the causes of condemnation are given in tabular form.—J. E.

—. (1935). **[Report of] Department of Pathology and Hygiene [Missouri].**— *Yearb. Missouri St. Poult. Ass. 1934.* pp. 15-17.

A brief reference to the poultry diseases prevalent in Missouri. There is nothing unusual to note.—J. E.

BOOK REVIEWS.

WILLMER, E. N. [M.A. Physiological Laboratory, Cambridge]. (1935). **Tissue Culture.** pp. xvi + 126. 9 text figs., 3 figs. on 2 plates. [Numerous refs.] London : Methuen & Co., Ltd. [8vo] [4s.]

The author has attempted, within the compass of this small handbook, to give a fair account of the part played by the method of tissue culture in helping to elucidate some of the problems of normal growth and differentiation, and in furthering the knowledge of the processes involved in the normal development of the animal organism. The book has been written mainly for the student of the various biological sciences, in order to give him some idea of how tissue culture may help him in his own particular branch, but it will well repay study by those working in the more restricted field of tissue culture itself, as it is also an up-to-date summary of the main advances which have been made in the subject during the past few years.

The subject is discussed under two main sections, of which the first is concerned with unorganized growth. The various methods of technique are described and the characteristics of the growth of fibroblasts, epithelia and wandering cells. The bearing of the differing nutrient media on the cell colony and the metabolism of the cells *in vitro* are fully discussed. The second section, which will perhaps interest the general reader most of all, deals with that very important application of tissue culture methods – the differentiation of normal tissues and the assumption and performance of the functions of the different kinds of living cells of the animal body. The author's concluding contention is well worth quoting. "Probably its [tissue culture's] greatest contribution to science so far lies not in any one particular discovery, but in the fact that the study of isolated cells and tissues in vitro has altered the conception of the cell." Readers interested in pathology will be disappointed that none of the applications of tissue culture to the growth of the malignant cell or to any of the other problems of pathology are discussed but this is too extensive a subject and much beyond the compass of such a handbook.

—JAMES STEWART.

MORTON, R. A. [D.Sc., Ph.D., F.I.C., Dept. of Chemistry, University of Liverpool]. (1935). **The Application of Absorption Spectra to the Study of Vitamins and Hormones.** pp. 70. 25 text figs., 3 plates, 3 tables. [Numerous refs.] London : Adam Hilger, Ltd. [8vo] [10s.]

In this little book, Dr. Morton deals principally with the application of spectrographic methods to vitamin research and, in a final brief chapter, indicates the small extent to which these methods have found application in the study of hormones. As he points out in the introductory chapter, in vitamin study the appeal to the animal has to be the first and final consideration, but the help obtained by the use of absorption spectra may be very considerable.

A chapter is devoted to each of the vitamins A, B_1, B_2, C, D and E and in each case our present knowledge of the chemical constitution is dealt with, together with the more recent work on the precursors of vitamins A and D. To the specialist in this field of research the book affords a valuable, concise and up-to-date account of the work and has numerous excellent references. The chapter on vitamin A is particularly well written and includes the results of the author's own investigations and findings on the application of spectrographic methods to the estimation of vitamin A, while table III should prove invaluable to those interested in the properties of carotenoids and related substances.

The book, though intended obviously for the specialist, is not without interest to those generally interested in vitamins and has the advantage of being well arranged and written in a pleasant style with the text, figures and plates very clearly presented.—A. EDEN.